THE SEMICONDUCTOR DATA LIBRARY

MOTOROLA Semiconductor Products Inc.

FOURTH EDITION

REFERENCE VOLUME

MASTER INDEX
MASTER SELECTION GUIDES
OUTLINE DRAWINGS
HARDWARE AND PACKAGING
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prepared by
Technical Information Center

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Die in diesem Buch enthaltenen Angaben wurden sorgfältig überprüft und sind nach unserer Meinung völlig zuverlässig. Wir können jedoch für die Genauigkeit dieser Angaben keine Verantwortung übernehmen. Darüber hinaus wird dem Käufer von Halbleiterelementen mit Angaben, die in dieser Bibliothek genannt werden, keine unter die Patentrechte eines Herstellers fallende Lizenz erteilt.

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Fourth Edition
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THE SEMICONDUCTOR DATA LIBRARY

One of the major problems facing workers in the electronics field is the identification and selection of semiconductor devices. Type numbers assigned to the semiconductors are of little value since they indicate neither device parameters nor applications. Because it is difficult even to identify the many thousands of device type numbers, let alone evaluate their merits for a particular application, engineers often limit their designs to a few well-known device types — despite the fact that newer or more suitable devices may be available. To help alleviate this problem, the Motorola Semiconductor Data Library has been developed.

The Motorola Semiconductor Data Library identifies and characterizes all semiconductor devices with 1N---,2N---,3N---, and 4N--- numbers registered with the Electronics Industries Association at the time the library was printed, as well as a broad line of devices with special in-house type numbers. (It provides complete data sheet specifications for a wide range of discrete semiconductors, and short-form specifications for integrated circuits.) And in addition, to simplify the selection of the most useful semiconductor type numbers, it contains carefully prepared selector guides with recommended devices for specific applications. Properly used, it can be a valuable aid for the design engineer, the component engineer, and the purchasing agent in narrowing the broad categories of potentially usable components to those best suited for a specific project.

COMPOSITION OF THE LIBRARY

The Semiconductor Data Library is divided into three volumes, organized as follows:

REFERENCE VOLUME

The reference volume is a self-contained compendium of semiconductor devices and integrated circuits information. This volume enables the user to locate and select devices for most any application or specific circuit. It also contains package and hardware information as well as applications information. Once a preliminary selection of a potentially suitable device has been made, consult Volumes I or II for detailed specifications for that particular device.

EIA Registered Device Index — Complete numerical index of all EIA registered device types, with major electrical specifications.

Non-Registered Device Index — Complete numerical index of all in-house non-registered Motorola device types, with major electrical specifications.

Master Selection Guides — Grouping of preferred devices by major device categories for quick preselection of devices best suited for specific applications. Includes semiconductor devices and ICs.

Military Device Listing — A complete list of Motorola devices that comply with Military Specifications.

Hardware and Packaging Information — Device mounting hardware, heat sinks and special device packaging.

Dimensioned Device Outlines — Dimensioned drawings of package outlines with JEDEC and Motorola cross reference. (Includes leadform drawings on specific packages.)

Application Note Catalog — Selection guide listing application note by application category. Also a brief summary of the available application note contents and how to order application notes.

To meet the requirements of a practical up-to-date reference, the Reference Volume of the Semiconductor Library will be completely updated and published twice a year.

VOLUME I

This volume contains complete data sheets for Motorola-manufactured devices with EIA-registered type numbers up to 1N4999 and 2N4999. Data sheets are in numerical sequence according to device type number except for those data sheets that cover several devices with differing type numbers. A numerical index in front of the book permits the user to quickly locate the page number of the data sheet for any device characterized in the book.

Since most of the device type numbers in the "below 5000" category have already been utilized by existing product, it is expected that this book will require little updating in the next few years. Accordingly, this volume will be reprinted only as required by the demand, and modifications will be made only when reprinting is required.

VOLUME II

This volume contains data sheets for all Motorola-manufactured, EIA registered devices with type numbers 1N5000 and 2N5000 and up, as well as those with 3N- - - type numbers. In addition, all active data sheets for devices with special Motorola type numbers (not registered with EIA) are included.

Because this book contains the detailed data for all the most recently developed semiconductors, it will be updated through the publication of supplements.

How to Use The Semiconductor Data Library

The library is designed to serve several specific functions;

1. To permit quick identification (together with major specifications) of EIA registered semiconductor devices with units with special Motorola type numbers.
2. To permit quick selection of the most suitable devices for a specific circuit application.
3. To permit quick selection of the devices that best meet a given set of electrical specifications.
4. To provide complete characterization of a broad line of components, encompassing most semiconductor categories, for a detailed comparison of device types.

The following examples illustrate several ways of using this library.

Problem: Device Identification
Known: Device Type Number
Information Needed: Device function, applications, major specifications.
Procedure: Consult the Master Index of the Reference Volume and locate the type number of the device in question in the alpha-numeric listing of the master index. The information given in this index lists not only the type of device it is, but also provides the major electrical specifications for the device. In addition, it indicates whether or not the device is manufactured by Motorola and, if not, whether Motorola can supply an electrically suitable equivalent. Complete data for Motorola manufactured devices can then be obtained, if required, from the other two volumes of your Semiconductor Data Library.

Problem: Device Preselection
Known: a) Intended circuit application for a particular device
b) Approximate electrical specifications of a desired device.
Information Needed: a) What devices are available for a specific circuit function?
b) What device types will best match a required set of electrical characteristics?

Procedure: Consult the Master Selection Guide section of the Reference Volume. This section contains product categories, i.e., power transistors, zener diodes, etc., and by specific market segments, including communications, consumer and military. An index to the individual selector guides is given at the beginning of the section for quick access to the pertinent guides. Complete data for Motorola manufactured devices can then be obtained, if required, from the other two volumes of your Semiconductor Data Library.

CATALOGUE DE SEMICONDUCTEURS

Identifier et ensuite choisir les dispositifs semiconducteurs constituent l'un des grands problèmes que rencontrent ceux qui travaillent dans le domaine de l'électronique. Les différents dispositifs sont désignés par des chiffres ne donnant aucune indication sur leurs paramètres et sur leurs applications. La difficulté pour les techniciens et ingénieurs d'identifier plusieurs milliers de dispositifs les amènent à utiliser, lors de la conception de circuits, des dispositifs bien connus alors que d'autres dispositifs mieux adaptés sont disponibles. Afin de pallier cet inconvénient, Motorola a donc institué ce catalogue de semiconducteurs.

Le Catalogue de Semiconducteurs de Motorola identifie et caractérise les dispositifs semiconducteurs enregistrés auprès de l'Association des Industries Electronqiues (EIA) par les symboles 1N--,2N--,3N-- et 4N-- ainsi que les dispositifs propres à Motorola avec des numéros spéciaux. (Ce catalogue contient les spécifications complètes pour tous les semiconducteurs discrets, et des spécifications abrégées pour les circuits intégrés.) De plus, afin de simplifier le choix des dispositifs les plus utiles, il contient également un "guide" mettant en évidence les dispositifs destinés à des applications bien spécifiques. Son utilisation adéquate peut donc être un outil de travail très utile pour l'ingénieur de circuit, l'ingénieur de composants, et l'acheteur en leur permettant de limiter le nombre de composants possible convenent le mieux pour un projet bien determiné.

INDEX DU CATALOGUE

Le Catalogue de Semiconducteurs comprend trois volumes:

VOLUME DE REFERENCE

Le volume de référence résume les renseignements sur les dispositifs semiconducteurs et circuits intégrés. Ce volume permet donc à l'utilisateur de déterminer et de choisir les dispositifs pour la majorité des applications; il contient également des renseignements sur les boitiers et sur les systèmes de montage. Une fois le choix du dispositif effectué, il suffit de consulter les Volumes I et II pour obtenir toutes les données concernant ce dispositif.

Index des Dispositifs Homologués par EIA

Cet index fournit également les données électriques principales.

Index des Dispositifs Non-Homologués

Cet index fournit une liste complète des dispositifs Motorola non-homologués, avec leurs données électriques principales.

Guide

Les dispositifs les plus utilisés y sont groupés par catégories principales pour un choix rapide des composants les mieux adaptés à certaines applications (y compris dispositifs discrets et circuits intégrés.)

Liste des Dispositifs Militaires

Cette liste fournit tous les dispositifs Motorola homologués par les Spécifications Militaires.

Boitiers et Modes de Montage

Fournit les modes de montage, les radiateurs et les boitiers spéciaux.

Dimension des Boitiers

Dessin et dimension des boitiers homologués par JEDEC et Motorola (y compris les dessins pour former les tiges.)

Catalogue de Notes d'Applications

Fournit une liste complète des notes d'applications groupées par catégories, également un résumé des notes d'applications disponibles et la marche à suivre pour les obtenir.

Il est évident qu'afin de garder ce catalogue à jour, le Volume de Référence sera complètement révisé et publié deux fois par an.

VOLUME I

Ce volume est constitué par les specifications pour les composants faits par Motorola avec les numéros homologués par EIA jusqu'à 1N4999 et 2N4999. Ces spécifications sont classées par ordre numérique sauf les spécifications qui se rapportent à plusieurs types de dispositifs. Un index numérique en première page permet à l'utilisateur de déterminer rapidemente le numéro de la page pour chaque dispositif décrit dans ce catalogue.

Il est probable que les dispositifs portant un numéro en-dessous de 5000 nécessiteront peu de mise à jour puisque tous ces numéros sont déjà utilisés. En conséquence, ce volume ne sera réimprimé que sur demande et les modifications apparaîtront uniquement lors de cette nouvelle édition.

VOLUME II

Ce volume est constitué par toutes les spécifications pour les dispositifs faits par Motorola, homologués par EIA avec numéros 1N5000, 2N5000, etc. ainsi que ceux avec les numéros 3N---. De plus, les spécifications de dispositifs avec numéros spéciaux de Motorola (non homologués par EIA) y sont incluses.

Ce catalogue sera mis à jour à l'aide d'éditions supplémentaires, car il contient toutes les données détaillées des dispositifs semiconducteurs les plus récents.

Méthode d'Utilisation du Catalogue de Semiconducteurs

Ce catalogue a pour but:

1. D'identifier rapidement, grâce aux spécifications principales, si le dispositif est homologué par EIA ou s'il s'agit d'un type spécial Motorola.
2. De sélectionner rapidement le dispositif le mieux adapté à un circuit.
3. De sélectionner rapidement un dispositif en fonction des spécifications électriques.
4. De fournir les données complètes de tout l'ensemble des composants Motorola — donc la majorité des dispositifs semiconducteurs — afin de pouvoir comparer tous les types de dispositifs.

Exemples de méthodes d'utilisation;

Question: Identifier le dispositif
Donnée: Type de dispositif
Renseignements Requis: Fonction du dispositif, applications et spécifications principales.

Méthode: Consulter l'Index du Volume de Référence et déterminer le numéro du dispositif en question parmi la liste numérique de l'index. Ce renseignement ainsi obtenu indique non seulement le type de dispositif mais également fournit les spécifications électriques principales de ce dispositif. De plus, le fabricant y sera précisé et le catalogue indiquera si Motorola peut fournir les dispositifs équivalents. Les deux autres volumes de ce catalogue vont maintenant fournir toutes les données sur les dispositifs faits par Motorola.

Question: Choix du Dispositif

Données:

a) Application probable du circuit pour un dispositif connu.

b) Spécifications électriques approximatives du dispositif en question.

Renseignements Requis:

a) Quels sont les dispositifs disponibles pour la fonction précise de ce circuit?
b) Quel type de dispositif va répondre à des caractéristiques électriques prédéterminées?

Méthode: Consulter le Guide dans le Volume de Référence qui est catégorisé par produits, c'est-à-dire transistors de puissance, diodes zener, etc., et par marchés, y compris communications, grand public, et militaire. Ces différentes catégories apparaissent en première page pour faciliter la sélection du Guide. Nous pouvons maintenant obtenir toutes les données sur les dispositifs faits par Motorola en utilisant les deux autres volumes du Catalogue de Semiconducteurs.

DIE HALBLEITER DATENBIBLIOTHEK

Eines der Hauptprobleme für Fachleute in der Elektronik-Industrie besteht in der Bestimmung und Selektion von Halbleitertypen. Die meisten Typenbezeichnungen geben wenig oder keine Auskunft über Parameter oder Anwendungen von speziellen Halbleitern. Viele tausend verschiedene Halbleitertypen sind heute erhältlich. Es ist fast unmöglich, auch nur einen geringen Prozentsatz aller Typen genau zu kennen. Somit bringen die meisten Ingenieure und Techniker nur die bekanntesten und gebräuchlichsten Halbleitertypen zur Anwendung, auch wenn neuere und bessere Elemente zur Verfügung stehen.

Um diesem Problem Abhilfe zu schaffen hat Motorola die meisten Halbleitertypen in eine Halbleitersammlung zusammengefasst. Diese Halbleitersammlung umfasst alle 1N, 2N, 3N und 4N Typen, die durch die "Electronics Industries Association" registriert sind. Weiterhin sind eine grosse Anzahl von Motorola In-Haus Typen in dieser Sammlung zusammengefasst. Vollständige Spezifikationen einer grossen Anzahl von diskreten Halbleitern und Kuzspezifikationen von integrierten Schaltkreisen sind vorhanden.

Zusätzlich sind, zur Vereinfachung der Aufsuche der meist gebrauchten Halbleitertypennummern, Nachschlagetabellen mit Vorzugstypen für bestimmte Anwendungen in der Sammlung enthalten.

Die Halbleitersammlung kann dem Entwicklungs und Komponent–Ingenieur sowie dem Einkäufer von Halbleitern gute Dienste leisten im Aufsuchen der best möglichen Elemente für eine bestimmte Anwendung.

ZUSAMMENSETZUNG DER HALBLEITERSAMMLUNG

Die Halbleitersammlung besteht aus drei Teilen, die folgendermassen zusammengefasst sind:

REFERENZ-BAND

Der Referenz-Band besteht aus einer übersichtlichen Zusammenfassung von Halbleitern und integrierten Schaltungen. Mit Hilfe dieses Referenzbandes lassen sich Halbleiter und integrierte Schaltungen für spezielle Anwendungszwecke leicht auffinden. Gehäuse–, Anwendungs– und Montagezubehörinformation sind ebenso im Referenzband angegeben. Nach der Wahl eines Halbleiters oder einer integrierten Schaltung aus dem Referenzband kann Band I oder Band II für die speziellen Daten zur Hilfe gezogen werden.

EIA Registriertes Halbleiter-Verzeichnis

Vollständiges numerisches Verzeichnis aller EIA registrierter Halbleiter Typen, mit den hauptsächlichen elektrischen Spezifikationen.

Nicht Registriertes Halbleiter-Verzeichnis

Vollständiges numerisches Verzeichnis aller nicht registrierter In-Haus Motorola Halbleiter Typen, mit den hauptsächlichen elektrischen Spezifikationen.

Hauptnachschlagewerk

Zusammenfassung in Gruppen der bevorzugten Hauptelementkategorien für schnelle Vorselektion der Elemente die am besten für gegebene Anwendungen in Frage kommen. Dieses Dokument enhält Halbleiterelemente und integrierte Kreise.

Militärelementen-Liste

Dies ist eine vollständige Liste von Motorola Bausteinen die Militärspezifikationen erfüllen.

Montagezubehör und Einkapselung Information

Bauelement-Montagezubehör, Kühlelemente und Spezial-Elementeneinkapselung.

Vermasste Elementen-Grundrisse

Vermasste Zeichnungen von Gehäusegrundrissen mit JEDEC und Motorola Gegenüberstellung. (Zeichnungen der Anschlussformen von gegebenen Gehäusen sind inbegriffen.)

Awendungsbericht-Katalog

Nachschlagliste der Anwendungsberichte welche in Anwendungskategorien zusammengefasst sind. Eine kurze Zusammenfassung des Inhalts der verfügbaren Berichte ist gegeben und ebenfalls wie sie bestellt werden können.

Um den Anforderungen eines praktischen, auf den letzten Stand gebrachten Nachschlagewerkes zu genügen wird der Referenz-Band der Halbleiterbibliothek zweimal im Jahr vollständig überarbeitet und publiziert.

BAND I

Dieser Band enthält vollständige Datenblätter der von Motorola fabrizierten Elemente mit EIA registrierten Nummern bis zu 1N4999 und 2N4999. Die Datenblätter sind in numerischer Ordnung gemäss der Bauelemente-Typennummer eingereiht. Ausnahme sind solche Datenblätter welche spezielle Elemente mit wechselnden Typennummern behandeln. Ein numerisches Verzeichnis am anfang des Bandes erlaubt dem Benützer ein schnelles Auffinden der Datenblätter für alle Elemente, die im Buch aufgeführt sind.

Weil die meisten Elemente-Typennummern in der Kategorie bis 5000 schon von bestehenden Produkten aufgebraucht wurden, ist erwartet, dass dieser Band in den nächsten Jahren wenig Ueberarbeitung verlangt. Dementsprechend wird dieses Buch nur neu gedruckt wenn die Nachfrage es verlangt und Modifikationen werden nur bei einer Neuauflage vorgenommen.

BAND II

Dieser Band enthält Datenblätter der von Motorola hergestellten EIA registrierten Elemente mit der Typennummer 1N5000 und 2N5000 und aufwärts und ebenfalls solche mit den 3N– – Typennummern. Alle aktiven Datenblätter für Elemente mit speziellen Motorola Typennummern (nicht EIA registriert) sind zusätzlich hier einbezogen.

Weil dieser Band die detaillierten Daten für alle der erst kürzlich entwickelten Halbleiter enthält, wird er durch Publikationen von Zusatzbüchern auf den letzten Stand gebracht.

Wie wird "Die Halbleiter Datenbibliothek" gebraucht

Die Bibliothek ist zusammengestellt worden um mehrere spezielle Funktionen zu erfüllen:

1. Erlaubt schnelle Bestimmung (zusammen mit Hauptspezifikationen) von EIA registrierten Halbleitern und Bausteinen mit speziellen Motorola Typennummern.
2. Erlaubt schnelle Selektion der best geeignetsten Elemente für eine bestimmte Schaltungsanwendung.
3. Erlaubt schnelle Selektion von Elementen welche am besten gegebene elektrische Spezifikationen erfüllen.
4. Liefert vollständige Charakterisation einer breiten Komponentenlinie, welche die meisten Halbleiter-Kategorien einschliesst. Erlaubt einen detaillierten Vergleich der Elementtypen.

Die nachfolgenden Beispiele veranschaulichen mehrere Wege um diese Bibliothek zu gebrauchen.

Problem: Elementen-Bestimmung
Bekannt: Elemente-Typennummer
Benötigte Information: Elementefunktion, Anwendung, Hauptspezifikationen

Vorgang: Im Hauptverzeichnis des Referenzbandes sind die Typennummern des zu untersuchenden Elementes in der alphanumerischen Liste aufgefuhrt. Die Information, die in diesem Verzeichnis gegeben ist, besteht nicht nur aus dem Elemententyp sondern auch die elektrischen Hauptspezifikationen sind gegeben. Zusätzlich ist angegeben ob das Element von Motorola hergestellt wird und, im Fall dass dies verneint wird, ob Motorola ein elektrisch vergleichbares Bauelement liefern kann. Wenn benötigt, können die vollständigen Daten der von Motorola hergestellten Halbleiter von den zwei anderen Bänden der Halbleiter Bibliothek erhalten werden.

Problem: Elementen-Vorbestimmung
Bekannt:

a) Vorgesehene Schaltkreisanwendung für ein bestimmtes Element.
b) Ungefähre elektrische Spezifikationen eines gewünschten Typs.

Benötigte Information:

a) Welche Elemente sind für eine bestimmte Kreisfunktion verfügbar?
b) Welche Elementtypen erfüllen am besten die erforderlichen elektrischen Charakteristiken?

Vorgang: Das Hauptnachschlagwerk des Referenzbandes wird aufgeschlagen. Dieses Kapitel enthält Produktkategorien, z.B. Leistungstransistoren, Zenerdioden etc. eingereiht in bestimmte Marktsegmente, einschliesslich Fernmeldewesen, Verbraucherindustrie und Militärbereich. Ein "Index" zu den einzelnen "Auswahl-Führern" ist am anfang dieses Kapitels gegeben, was zum schnellen Auffinden der zutreffenden "Führer" hilft. Vollständige Daten der von Motorola hergestellten Elemente können, wenn benötigt, von den zwei anderen Bänden entnommen werden.

THE SEMICONDUCTOR DATA LIBRARY
（半導体データ ライブラリー）

電子工業にたずさわっているものが直面する難問の１つは、半導体製品の分類と選択である．　個々の製品の型番号はその製品のパラメータや用途を直接示すものではないので大して役には立たない．

特定の用途に対して製品のメリットを検討することなどは云うにおよばず、数万にのぼる型番号を分類することも非常に困難なことである．　したがって新製品やより適切な製品があるにも拘らず、技術者が設計にあたって採用するのは少数のよく知られている製品に限られてしまうことがよくある．このライブラリは、このような問題を解決するために編集されたものである．

このライブラリはＥＩＡ（電子工業会）に登録された 1N…., 2N…., 3N…., 4N……番号をもつすべてのディスクリート（半導体製品）と登録外のモトローラ製品を巾広く分類し、その特性を収録している．

またＩＣ製品についても概略データが記載されている。

さらに最も適当な製品を簡単に選択できるように用途別に推薦製品をセレクタ・ガイドとして紹介しているので、設計技術者、部品技術者および購買担当者は膨大な半導体製品の中から特定のプロジェクトに最も適したものだけにしぼることができる．

ライブラリの構成

このライブラリは３巻に分れ次のように構成されている．

REFERENCE VOLUME
（リファレンス・ボリューム）

この巻は半導体製品とＩＣ製品の完全な概略データを収録しているので、ユーザーはどんな用途や回路に使う素子でも選び出すことができる．　またパッケージ、取付け部品および応用例も記載されている．　この巻で適当な素子をあらかじめ選び出すと、第１巻および第２巻でそれらの詳細なデータを調べることができる．

ＥＩＡ登録製品の索引　ＥＩＡ（電子工業会）に登録された全製品の完全な番号順索引と主な電気特性．

ＥＩＡ登録外製品の索引　モトローラ社の標準規格品の完全な番号順索引と主な電気特性．

マスタ・セレクション・ガイド　半導体製品とＩＣ製品を含め、最適な素子が簡単に選び出せるよう用途別に分類されている．

政府用製品リスト　政府の仕様によるモトローラ製品の完全なリスト．

取付け部品とパッケージング　取付け部品、ヒート・シンクおよび特別品のパッケージング．

ケースの概略平面図　ＪＥＤＥＣとモトローラ製品の互換性データとケースの概略平面図（特定のパッケージのリードフォームの図を含む．）

アプリケーション・ノート・カタログ　用途別アプリケーション・ノートのセレクション・ガイドと各ノートの要約および注文方法．

最新情報に対する要望に応えるため、この巻は年２回発行され完全な最新情報を収録している．

VOLUME I（第１巻）

第１巻はＥＩＡに登録された１Ｎ４９９９および２Ｎ４９９９までのモトローラ製品の完全なデータを収録している．　数種の製品番号をまとめて記載しているデータ・シートを除いてはすべて番号順に整理されている．　巻頭の番号順索引から、第１巻中のどの製品についてもデータ記載ページが簡単に調べられる．

５０００以下の型番号に対しては既にほとんど製品ができているので、この巻は２、３年後も再版の必要はないと思われる．　したがって必要がある場合にのみ再版され、修正が加えられる．

VOLUME II（第２巻）

第２巻は１Ｎ５０００と２Ｎ５０００以上および３Ｎの型番号でＥＩＡに登録されたモトローラ製品と、登録外のモトローラ標準規格品の全データ・シートを収録している．　第２巻にはごく最近開発された半導体製品の詳細なデータまで収録され、なお増補版が追加されるので、つねに最新のデータが得られる．

半導体データ・ライブラリの使用法

このライブラリは次のように使える．

1）　ＥＩＡに登録された半導体製品とモトローラ社の型番号をもった製品が容易に確認でき、主な特性を調べることができる．

2）　特定の回路応用例に対して最適の製品を迅速に選び出すことができる．

3）　指定された電気特性に最もよくあう製品を容易に選択できる．

4）　広範囲にわたる半導体製品の完全な特性を収録しているので、詳細にわたって製品の比較ができる．

具体的な使用例を紹介してみよう．

例： 製品の確認

わかっていること： 型番号

調べたいこと： 製品の機能、応用例、特性

方　法： まず、リファレンス・ボリュームのマスタ・インデックスをひき、アルファベット番号順リストで、自分の製品番号をみつける．　この索引では製品の型番号だけでなく、主な電気特性およびモトローラ製かどうかということも表示している．もしモトローラ製品でない場合は、電気的に適当な同等品があるかどうかがわかる．　モトローラ製品の完全なデータが必要な場合は、半導体データ・ライブラリの第1巻および第2巻から調べることができる．

例： 製品の予備選択

わかっていること：

a） 特定の製品に対する応用企画．

b） 必要な電気的特性．

調べたいこと：

a） 目的にあう製品にはどんなものがあるか．

b） どんなタイプの製品が最適であるか．

方　法： まず、リファレンス・ボリュームのマスタ・セレクション・ガイドの章をみる．　この章は通信機器用、民生機器用、政府用機器を含めて、パワ・トランジスタあるいはゼナー・ダイオード等種類別に記載されている．　この章の第1ページにはセレクタ・ガイドがついており使いやすい．　モトローラ製品の完全なデータが必要な場合は、半導体データ・ライブラリの第1巻および第2巻から調べることができる．

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NUMERICAL INDEX

1N--- TYPE NUMBERS

The following table provides a master numerical index for 1N type numbers and short-form specifications for rectifiers, zeners, signal diodes and reference diodes. Specifications for four-layer diodes, transient suppressors, varactors, microwave and UHF diodes are given in tables beginning on page 1-110.

KEY

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C

TYPE NO.:
Numerical Listing
of Registered
Type Numbers
***Available from
Motorola**

MATERIAL:
S – Silicon
G – Germanium
A – Gallium Arsenide
E – Selenium

REPLACEMENT:
Type number of recommended replacement or of nearest electrical equivalent

REFERENCE:
First type number on data sheet where the EIA type or replacement part number is located
OR
Table where short-form specifications are given

RECTIFIERS
SHOWN IN BOLD TYPE

V_{RWM} – Peak Working Reverse Voltage

V_F – Forward Voltage Drop (Average and Peak values shown without distinction)

I_O – Average Forward Current Rating

I_R – Average Reverse Current

I_{FSM} – Peak Surge Current

ZENER DIODES
SHOWN IN BOLD TYPE

V_Z(Nom) – Nominal Zener Breakdown Voltage

I_{ZT} – Test Current for Zener Voltage

Tol – Tolerance for Specified Nominal Zener Breakdown Voltage

P_D – Maximum Power Dissipation
m – mW
W – W

SIGNAL DIODES
SHOWN IN LIGHT TYPE

PRV – Peak Reverse Voltage

V_F @ I_F – Maximum Forward Voltage at Indicated Forward Current,
A – Ampere
m – mA

I_R – Reverse Current –
m – mA
n – nA
* – µA

t_{rr} – Reverse Recovery Time

REFERENCE DIODES
SHOWN IN LIGHT TYPE

V_Z(Nom) – Nominal Zener Breakdown Voltage

T_C – Average Temperature Coefficient over Temperature Range

I_{ZT} – Test Current for Zener Voltage

Temp Range – Operating Range of Average T_C

The Codes Listed Below Identify The Type of Products.

CODE	PRODUCT	CODE	PRODUCT
3	3-layer (diac)	I	Current Regulator
4	4-layer Diode	J	Hot-Carrier (Schottky) Signal Diode
A	Assembly	M	Microwave/UHF Diode
B	Backward Diode	P	Power Transient Suppressor
C	Clipper	R	Reference Diode
D	Light Detector	S	Signal Diode, General Purpose
E	Light-Emitter	T	Tunnel Diode
F	Fast Recovery Rectifier	V	Varactor
G	General-Purpose Rectifier	Z	Zener Diode
H	Hot-Carrier (Schottky) Rectifier		

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N23H			Table 4	M									
1N34	G			S	60	1.0	8.5m	15*					
1N34A	G			S	60	1.0	5.0m	30*					
1N35	G			S	50			2.0m					
1N38	G			S	100	1.0	7.5m	25*					
1N38A	G			S	100	1.0	4.0m	6.0*					
1N38B	G			S	100	1.0	4.0m	6.0*					
1N39	G			S	200	1.0	5.0m	40*					
1N39A	G			S	200	1.0	5.0m	40*					
1N39B	G			S	200	1.0	4.0m	650*					
1N40	G			S	25								
1N41	G			S	25								
1N42	G			S	50								
1N43	G			S	60	1.0	5.0m	20*					
1N44	G			S	115	1.0	3.0m	410*					
1N45	G			S	75	1.0	3.0m	410*					
1N46	G			S	50	1.0	3.0m	1.5m					
1N47	G			S		1.0	5.0m	400*					
1N48	G			S	85	1.0	4.0m	833*					
1N49	G			S	50	1.0	4.0m						
1N50	G			S	50	1.0	4.0m						
1N51	G			S	50	1.0	2.5m						
1N52	G			S	85	1.0	4.0m	150*					
1N52A	G			S	50	1.0	5.0m	100*					
1N53	S		Table 4	M									
1N53A	S		Table 4	M									
1N53B	S		Table 4	M									
1N53C	S		Table 4	M									
1N53D	S		Table 4	M									
1N54	G			S	35	1.0	5.0m	10*					
1N54A	G			S	50	1.0	5.0m	7.0*					
1N55	G			S	150	1.0	3.0m	0.3m					
1N55A	G			S	150	1.0	4.0m	500*					
1N55B	G			S	190	1.0	5.0m	500*					
1N56	G			S	30	1.0	15m	300*					
1N56A	G			S	40	1.0	15m	300*					
1N57	G			S	80	1.0	3.6m	300*					
1N58	G			S	100	1.0	5.0m	800*					
1N58A	G			S	100	1.0	4.0m	600*					
1N59	G			S	250	1.0	3.0m	800*					
1N60	G			S	50	1.0	5.0m	40*					
1N60A	G			S	40								
1N61	G			S	130	1.0	5.0m	300*					
1N62	G			S	110	1.0	5.0m	700*					
1N63	G			S	125	1.0	4.0m	50*					
1N63A	G			S	100	1.0	4.0m	50*					
1N64	G			S	20								
1N65	G			S	85	1.0	2.5m	200*					
1N66	G			S	60	1.0	5.0m	50*					
1N66A	G			S	60	1.0	5.0m	50*					
1N67	G			S	80	1.0	4.0m	5.0*					
1N67A	G			S	100	1.0	4.0m	5.0*					
1N68	G			S	100	1.0	3.0m	625*					
1N68A	G			S	130	1.0	3.0m	625*					
1N69	G			S	75	1.0	5.0m	50*					
1N69A	G			S	60	1.0	5.0m	30*					
1N70	G			S	125	1.0	3.0m	25*					
1N70A	G			S	100	1.0	3.0m	25*					
1N71	G			S	40	1.0	15m	0.3m					
1N73	G			S		1.7	15m	0.05m					
1N74	G			S		1.8	15m	0.05m					
1N75	G			S	125	1.0	2.5m	50*					
1N76	S		Table 4	M									
1N76A	S		Table 4	M									
1N77A				D									
1N77B				D									
1N78	S		Table 4	M									
1N78A	S		Table 4	M									
1N78B	S		Table 4	M									
1N78C	S		Table 4	M									

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N78D	S		Table 4	M									
1N78E	S		Table 4	M									
1N78F	S		Table 4	M									
1N79				M									
1N81	G			S	50	1.0	3.0m	10*					
1N81A	G			S	40	1.0	3.0m	10*					
1N82	S		Table 4	M									
1N82A	S		Table 4	M									
1N82AG	S		Table 4	M									
1N82G	S		Table 4	M									
1N83	G			S	225	1.0	5.0m	30*					
1N84	G			S	12	1.0	60m	0.1m					
1N85				D									
1N86	G			S	70	1.0	4.0m	50*					
1N87	S			S	23	0.25	0.1m	30*					
1N87A	S			S	23	0.25	0.1m	10*					
1N88	G			S	85	1.0	2.5m	0.1m					
1N89	G			S	100	1.0	3.5m	8.0*					
1N90	G			S	75	1.0	5.0m	800*					
1N91	G			G	**100**	**0.5**	**0.15**	**4.0**	**25**				
1N92	G			G	**200**	**0.5**	**0.1**	**2.0**	**25**				
1N93	G			G	**300**	**0.5**	**0.075**	**1.3**	**25**				
1N94	G			G	**380**	**0.7**	**0.5**	**0.8**	**25**				
1N95	G			S	75	1.0	10m	800*					
1N96	G			S	75	1.0	20m	800*					
1N96A	G			S	60	1.0	40m	500*					
1N97	G			S	100	1.0	10m	100*					
1N98	G			S	100	1.0	20m	100*					
1N98A	G			S	250	1.0	40m	100*					
1N99	G			S	100	1.0	10m	50*					
1N100	G			S	100	1.0	20m	50*					
1N100A	G			S	80	1.0	40m	0.05m					
1N101	G			S	150	1.0	10m	10*					
1N102	G			S	75	1.0	15m	3.0*					
1N103	G			S	12	1.0	30m	0.1m					
1N104	G			S	12	1.0	30m	0.1m					
1N105	S		Table 4	M									
1N106	G			S	300	1.0	20m	70*					
1N107	G			S	10	1.0	150m	200*					
1N108	G			S	50	1.0	50m	200*					
1N109	G			S	15	1.0	1.0m	0.1m					
1N110	G		Table 4	M									
1N111	G			S	70	1.0	5.0m	25*					
1N112	G			S	70	1.0	5.0m	50*					
1N113	G			S	70	1.0	2.5m	25*					
1N114	G			S	70	1.0	2.5m	50*					
1N115	G			S	70	1.0	2.5m	100*					
1N116	G			S	75	1.0	5.0m	100*					
1N117	G			S	75	1.0	10m	100*					
1N118	G			S	75	1.0	20m	100*					
1N118A	G			S	60	1.0	40m	0.1m					
1N119	G			S	60	1.0	5.0m		0.5				
1N120	G			S	60	1.0	5.0m		0.5				
1N124	G		Table 4	M									
1N124A	G		Table 4	M									
1N126	G			S	75	1.0	5.0m	50*					
1N126A	G			S	75	1.0	25m	50*					
1N127	G			S	125	1.0	3.0m	25*					
1N127A	G			S	125	1.0	25m	25*					
1N128	G			S	50	1.0	3.0m	10*					
1N128A	G			S	40	1.0	3.0m	10*					
1N132	G			S	25								
1N133	G			S	5.0	0.5	3.0m	300*					
1N134			Table 4	M									
1N137A	S			S	36	1.0	3.0m	0.03*					
1N137B	S			S	36	1.0	20m	0.03*					
1N138A	S			S	18	1.0	5.0m	0.01*					
1N138B	S			S	18	1.0	40m	0.01*					
1N139	G			S	40	1.0	20m	1.5m					
1N140	G			S	70	1.0	40m	300*					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N141	G			S	70	1.0	20m	50*					
1N142	G			S	100	1.0	5.0m	100*					
1N143	G			S	100	1.0	40m	100*					
1N144	G			S	30	1.0	100m	200*					
1N145	G			S	30	1.0	40m	100*					
1N147	G		Table 4	M									
1N147A	G		Table 4	M									
1N149	S		Table 4	M									
1N150	S		Table 4	M									
1N151	G			G	**100**	**0.7**	**0.5**	**2.4**	**25**				
1N152	G			G	**200**	**0.7**	**0.5**	**1.9**	**25**				
1N153	G			G	**300**	**0.7**	**0.5**	**1.2**	**25**				
1N155	S		Table 4	M									
1N155A	S		Table 4	M									
1N156	S		Table 4	M									
1N158	G			G	**380**	**1.4**	**0.5**	**0.8**	**25**				
1N160	S		Table 4	M									
1N173A	S		Table 4	M									
1N188				D									
1N189				D									
1N190	G			S	3.0	0.75	10m	0.8m					
1N191	G			S	90	1.0	5.0m		0.5				
1N192	G			S	70	1.0	5.0m		0.5				
1N193	S			S	40	2.0	1.0m	40*	0.5				
1N194	S			S	40	2.0	1.5m	10*	0.2				
1N194A	S			S	40	1.0	1.0m	10*	0.2				
1N195	S			S	40	2.0	2.0m	10*	0.3				
1N196	S			S	40	2.0	1.0m	10*	0.1				
1N198	G			S	80	1.0	4.0m	10*					
1N198A	G			S	80	1.0	4.0m	10*					
1N198B	G			S	80	1.0	4.0m	10*	0.3				
1N200	S			S	6.8	1.0	50m						
1N201	S			S	8.2	1.0	35m						
1N202	S			S	10	1.0	30m						
1N203	S			S	12	1.0	23m						
1N204	S			S	15	1.0	17m						
1N205	S			S	18	1.0	12m	0.1*					
1N206	S			S	22	1.0	9.0m	0.1*					
1N207	S			S	27	1.0	7.0m	0.1*					
1N208	S			S	33	1.0	5.5m	0.1*					
1N209	S			S	39	1.0	4.5m	0.1*					
1N210	S			S	47	1.0	3.5m	0.1*					
1N211	S			S	56	1.0	2.7m	1.0*					
1N212	S			S	68	1.0	2.0m	1.0*					
1N213	S			S	82	1.0	1.5m	1.0*					
1N214	S			S	100	1.0	1.2m	1.0*					
1N215	S			S	120	1.0	0.9m	1.0*					
1N216	S			S	150	1.0	0.7m	5.0*					
1N217	S			S	180	4.0	6.5m	5.0*					
1N218	S			S	220	4.0	6.0m	5.0*					
1N219	S			S	270	4.0	3.0m	5.0*					
1N220	S			S	330	4.0	2.2m	5.0*					
1N221	S			S	390	4.0	2.0m	5.0*					
1N222	S			S	470	4.0	1.5m	5.0*					
1N225	S			C						10	0.2		150m
1N225A	S			C						9.1	0.2	5.0	150m
1N226	S			C						12	0.2		150m
1N226A	S			C						10	0.2	5.0	150m
1N227	S			C						14.5	0.2		150m
1N227A	S			C							0.2	5.0	150m
1N228	S			C						18	0.2		150m
1N228A	S			C							0.2	5.0	150m
1N229	S			C						21	0.2		150m
1N229A	S			C							0.2	5.0	150m
1N230	S			C						27	0.2		150m
1N231	S			C						32	0.2		150m
1N232	S			C						39	0.2		150m
1N233	S			C						45	0.2		150m
1N234	S			C						54	0.2		150m
1N235	S			C						64	0.2		150m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N236	S			C						80	0.2		150m
1N237	S			C						100	0.2		150m
1N238	S			C						120	0.2		150m
1N239	S			C						145	0.2		150m
1N248	S			G	50	1.5	10	5.0	200				
1N248A	S	1N248B	1N248B	G	50	1.5	20	5.0	250				
★1N248B	S		1N248B	G	50	1.5	20	5.0	250				
★1N248C	S		1N248B	G	39	1.2	20	3.8	350				
1N249	S		1N248B	G	100	1.5	10	5.0	200				
★1N249A	S	1N249B	1N248B	G	100	1.5	20	5.0	250				
★1N249B	S		1N248B	G	100	1.5	20	5.0	250				
★1N249C	S		1N248B	G	77	1.2	20	3.6	350				
1N250	S			G	200	1.5	10	5.0	200				
1N250A	S	1N250B	1N248B	G	200	1.5	20	5.0	250				
★1N250B	S		1N248B	G	200	1.5	20	5.0	250				
★1N250C	S		1N248B	G	154	1.2	20	3.4	350				
1N251	S			S	30	1.0	5.0m	0.1*	0.15				
1N252	S			S	20	1.0	10m	0.1*	0.15				
1N253	S	MR1121	MR1120	G	95	1.5	1.0	0.1	4.0				
1N254	S	MR1122	MR1120	G	190	1.5	0.4		1.5				
1N255	S	MR1124	MR1120	G	380	1.5	0.4		1.5				
1N256	S	MR1126	MR1120	G	570	1.5	0.2		1.0				
1N259	S		Table 4	M									
1N263	G		Table 4	M									
1N264	S		Table 4	M									
1N265	G			S	90	1.0	3.2m	100*					
1N266	G			S	60	1.0	4.0m	75*					
1N267	G			S	25	1.0	3.5m	12*					
1N268	G			S	30	1.0	2.5m	20*					
1N269	G		Table 4	M									
1N270	G			S	80	1.0	200m	100*					
1N273	G			S	30	1.0	100m	20*					
1N276	G			S	50	1.0	40m	100*	0.3				
1N277	G			S	100	1.0	100m	75*					
1N278	G			S	50	1.0	20m	125*					
1N279	G			S	30	1.0	100m	200*					
1N281	G			S	60	1.0	100m	30*					
1N282	G			S		1.0	40m	20m					
1N283	G			S	20	1.0	200m	20*					
1N285			Table 4	M									
1N286	S		Table 4	M									
1N286A	S		Table 4	M									
1N287	G			S	60	1.0	20m	1.5m					
1N288	G			S	85	1.0	40m	350*					
1N289	G			S	85	1.0	20m	50*					
1N290	G			S	120	1.0	5.0m	100*					
1N291	G			S	120	1.0	40m	100*					
1N292	G			S	75	1.0	100m	200*					
1N294	G			S	60	1.0	5.0m	10*					
1N294A	G			S	60	1.0	5.0m	10*					
1N295	G			S	40			200*					
1N295A	G			S	40			200*					
1N296	G			S	40			200m					
1N297	G			S	80	1.0	3.5m	10*					
1N297A	G			S	80	1.0	3.5m	10*					
1N298	G			S	70	2.0	30m						
1N298A	G			S	30	2.0	30m	250*					
1N299	G			S		0.5	3.0m	200m					
1N300	S			S	15	1.0	15m	0.001*					
1N300A	S			S	15	1.0	30m	0.001*					
1N300B	S			S	15	1.0	50m	0.001*					
1N301	S			S	70	1.0	5.0m	0.05*					
1N301A	S			S	70	1.0	18m	0.05*					
1N301B	S			S	70	1.0	50m	0.01*					
1N302	S			S	225	1.0	1.0m	0.2*					
1N302A	S			S	225	1.0	5.0m	0.2*					
1N303	S			S	125	1.0	3.0m	0.1*					
1N303A	S			S	125	1.0	12m	0.1*					
1N303B	S			S	125	1.0	50m	0.1*					
1N304	S			S	55	1.5	2.0m	2.0*					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N305	G			S	60	0.8	100m	20*					
1N306	G			S	15	0.8	100m	2.0*					
1N307	G			S	125	1.0	100m	5.0*					
1N308	G			S	8.0	1.0	300m	500*					
1N309	G			S	40	1.0	100m	100*					
1N310	G			S	125	1.0	40m	20*					
1N311	S		Table 4	M									
1N312	G			S	60	1.0	70m	50*					
1N313	G			S	125	1.0	40m	10*					
1N314	G			S				0.05m					
1N315	G			G	**300**	**0.48**	**0.075**	**0.3**	**25**				
1N315A	G			G	**200**	**0.48**	**0.1**	**0.16**	**25**				
1N316	S	1N4001	1N4001	G	**50**	**2.0**	**0.2**		**2.0**				
1N317	S	1N4002	1N4001	G	**100**	**2.0**	**0.2**		**2.0**				
1N318	S	1N4003	1N4001	G	**200**	**2.0**	**0.2**		**2.0**				
1N319	S	1N4004	1N4001	G	**350**	**2.0**	**0.2**		**2.0**				
1N320	S	1N4005	1N4001	G	**500**	**2.0**	**0.2**		**2.0**				
1N321	S	1N4007	1N4001	G	**850**	**1.2**	**0.25**	**1.0**	**10**				
1N322	S	1N4007	1N4001	G	**850**	**1.2**	**0.25**	**1.0**	**10**				
1N323	S	1N4001	1N4001	G	**50**	**2.0**	**0.4**		**2.0**				
1N324	S	1N4002	1N4001	G	**100**	**2.0**	**0.4**		**2.0**				
1N325	S	1N4003	1N4001	G	**200**	**2.0**	**0.4**		**2.0**				
1N326	S	1N4004	1N4001	G	**350**	**2.0**	**0.4**		**2.0**				
1N327	S	1N4005	1N4001	G	**500**	**2.0**	**0.4**		**2.0**				
1N328	S	1N4007	1N4001	G	**850**	**1.2**	**0.4**	**0.06**	**10**				
1N329	S	1N4007	1N4001	G	**1000**	**1.2**	**0.4**	**0.06**	**10**				
1N330	S			S	32	1.0	3.0m	0.03*					
1N331	S			S	16	1.0	5.0m	0.01*					
1N332	S	MR1124	MR1120	G	**400**	**2.0**	**0.4**	**0.2**	**10**				
1N333	S	MR1124	MR1120	G	**400**	**2.0**	**0.2**	**0.2**	**5.0**				
1N334	S	MR1123	MR1120	G	**300**	**2.0**	**0.4**	**0.2**	**10**				
1N335	S	MR1123	MR1120	G	**300**	**2.0**	**0.2**	**0.2**	**5.0**				
1N336	S	MR1122	MR1120	G	**200**	**2.0**	**0.4**	**0.1**	**10**				
1N337	S	MR1122	MR1120	G	**200**	**2.0**	**0.2**	**0.1**	**5.0**				
1N338	S	MR1121	MR1120	G	**100**	**2.0**	**1.0**	**0.2**	**20**				
1N339	S	MR1121	MR1120	G	**100**	**2.0**	**0.4**	**0.1**	**10**				
1N340	S	MR1121	MR1120	G	**100**	**2.0**	**0.2**	**0.1**	**5.0**				
1N341	S	MR1124	MR1120	G	**400**	**2.0**	**0.4**	**0.5**	**10**				
1N342	S	MR1124	MR1120	G	**400**	**2.0**	**0.2**	**0.5**	**5.0**				
1N343	S	MR1123	MR1120	G	**300**	**2.0**	**0.4**	**0.5**	**10**				
1N344	S	MR1123	MR1120	G	**300**	**2.0**	**0.2**	**0.5**	**5.0**				
1N345	S	MR1122	MR1120	G	**200**	**2.0**	**0.4**	**0.5**	**10**				
1N346	S	MR1122	MR1120	G	**200**	**2.0**	**0.2**	**0.5**	**5.0**				
1N347	S	MR1121	MR1120	G	**100**	**2.0**	**1.0**	**0.5**	**20**				
1N348	S	MR1121	MR1120	G	**100**	**2.0**	**0.4**	**0.5**	**10**				
1N349	S	MR1121	MR1120	G	**100**	**2.0**	**0.2**	**0.5**	**5.0**				
1N350	S			S	70	1.0	20m	0.03*					
1N351	S			S	120	1.0	20m	0.03*					
1N352	S			S	170	1.0	20m	0.05*					
1N353	S			S	225	1.0	20m	0.1*					
1N354	S			S	325	1.0	20m	0.1*					
1N355	G			S	100	1.0	4.0m	50*					
1N358	S			S									
1N358A	S			S									
1N359	S	1N4001	1N4001	G	**50**	**2.0**	**0.1**		**2.0**				
1N360	S	1N4002	1N4001	G	**100**	**2.0**	**0.1**		**2.0**				
1N361	S	1N4003	1N4001	G	**200**	**2.0**	**0.1**		**2.0**				
1N362	S	1N4004	1N4001	G	**350**	**2.0**	**0.1**		**2.0**				
1N363	S	1N4005	1N4001	G	**500**	**2.0**	**0.1**		**2.0**				
1N364	S	1N4007	1N4001	G	**850**	**1.2**	**0.1**	**0.06**	**10**				
1N365	S	1N4007	1N4001	G	**1000**	**1.2**	**0.1**	**0.06**	**10**				
1N367	G			S	15								
1N368	G			G	**200**	**0.5**	**0.1**	**0.3**	**25**				
1N368A	G			G	**200**	**0.5**	**0.1**	**0.16**	**25**				
1N369	S		Table 4	M									
1N369A	S		Table 4	M									
1N370	S	1N5221B	1N5221	Z						**1.8**	**20**	**+20**	**200m**
1N371	S	1N5221A	1N5221	Z						**2.4**	**20**	**+20**	**200m**
1N372	S	1N5225A	1N5221	Z						**2.9**	**15**	**+20**	**200m**
1N373	S	1N5227A	1N5221	Z						**3.5**	**10**	**+20**	**200m**

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N374	S	1N5229A	1N5221	Z						4.1	10	10	200m
1N375	S	1N5230A	1N5221	Z						4.8	10	5.0	200m
1N376	S	1N5233A	1N5221	Z						5.8	10	5.0	200m
1N377	S	1N5236A	1N5221	Z						7.1	13	5.0	200m
1N378	S	1N5238A	1N5221	Z						8.75	14	0.2	200m
1N379	S	1N5240A	1N5221	Z						10.5	15	0.2	200m
1N380	S	1N5243A	1N5221	Z						12.8	14	0.2	200m
1N381	S	1N5246A	1N5221	Z						15.8	15	0.2	200m
1N382	S	1N5249A	1N5221	Z						19	10	0.2	200m
1N383	S	1N5252A	1N5221	Z						23.5	15	0.2	200m
1N384	S	1N5255A	1N5221	Z						28.5	12	0.2	200m
1N385	S	1N5258A	1N5221	Z						34.5	13	0.2	200m
1N386	S	1N5260A	1N5221	Z						41	10	0.2	200m
1N387	S	1N5261A	1N5221	Z						48.5	11	0.2	200m
1N388	S	1N5264A	1N5221	Z						58	10	0.2	200m
1N389	S	1N5266A	1N5221	Z						71	14	0.2	200m
1N390	S	1N5269A	1N5221	Z						87.5	15	0.2	200m
1N391	S	1N5271A	1N5221	Z						105	15	0.2	200m
1N392	S	1N5274A	1N5221	Z						127.5	14	0.2	200m
1N393	S	1N5277A	1N5221	Z						157.5	14	0.2	200m
1N394	S	1N5280A	1N5221	Z						190	10	0.2	200m
1N395	S			Z						235	15	0.1	200m
1N396	S			Z						285	12	0.1	200m
1N397	S			Z						345	13	0.1	200m
1N398	S			Z						410	10	0.1	200m
1N399	S			Z						485	11	0.1	200m
1N400	S			Z						580	10	0.1	200m
1N401	S			S	1.5								
1N402	S			S	2.0								
1N403	S			S	2.5								
1N404	S			S	3.1								
1N405	S			S	3.7	1.0	225m						
1N406	S			S	4.3	1.0	200m						
1N407	S			S	5.2	1.0	170m						
1N408	S			S	6.2	1.0	130m						
1N411B	S	MR1810SB	MR1210	G	50	1.5	50	25	525				
1N412B	S	MR1811SB	MR1210	G	100	1.5	50	25	525				
1N413B	S	MR1813SB	MR1210	G	200	1.5	50	25	525				
1N415B	S		Table 4	M									
1N415C	S		Table 4	M									
1N415D	S		Table 4	M									
1N415E	S		Table 4	M									
1N415F	S		Table 4	M									
1N415G	S		Table 4	M									
1N415H	S		Table 4	M									
1N416B	S		Table 4	M									
1N416C	S		Table 4	M									
1N416D	S		Table 4	M									
1N416E	S		Table 4	M									
1N416F	S		Table 4	M									
1N416G	S		Table 4	M									
1N417	G			S	60				0.3				
1N418	G			S	60	1.0	7.0m		0.3				
1N419	G			S	80	1.0	125m		0.3				
★1N429	S		1N429	R						6.2		7.5	
1N430	S	1N3156	1N3154	R						8.4	0.002	10	-55/100
1N430A	S	1N3157	1N3154	R						8.4	0.001	10	-55/100
1N430B	S	1N3157A	1N3154	R						8.4	0.001	10	-55/150
1N431	S			S	68	0.55	15m						
1N432	S			S	40	1.0	10m	5.0n					
1N432A	S			S	40	1.0	20m	5.0n					
1N433	S			S	145	1.0	3.0m	0.1*					
1N433A	S			S	145	1.0	10m	0.1*					
1N434	S			S	180	1.0	2.0m	0.1*					
1N434A	S			S	180	1.0	7.0m	0.1*					
1N435	G			S	40			0.3m					
1N440	S	1N4002	1N4001	G	100	1.5	0.3	0.3					
1N440B	S	1N4002	1N4001	G	100	1.5		0.3	15				
1N441	S	1N4003	1N4001	G	200	1.5	0.3	0.75					
1N441B	S	1N4003	1N4001	G	200	1.5			15				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	ZENER DIODES V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	REFERENCE DIODES V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N442	S	1N4004	1N4001	G	300	1.5	0.3	1.0					
1N442B	S	1N4004	1N4001	G	300	1.5		0.001	15				
1N443	S	1N4004	1N4001	G	400	1.5	0.3	1.5					
1N443B	S	1N4004	1N4001	G	400	1.5			15				
1N444	S	1N4005	1N4001	G	500	1.5	0.3	1.75					
1N444B	S	1N4005	1N4001	G	500	1.5			15				
1N445	S	1N4005	1N4001	G	600	1.5	0.3	2.0					
1N445B	S	1N4005	1N4001	G	600	1.5		0.002	15				
1N446	S			M									
1N447	G			S	30	1.0	25m	20*					
1N448	G			S	100	1.0	25m	30*					
1N449	G			S	30	1.0	50m	10*					
1N450	G			S	100	1.0	50m	30*					
1N451	G			S	150	1.0	50m	150*					
1N452	G			S	30	1.0	100m	30*					
1N453	G			S	100	1.0	100m	30*					
1N454	G			S	50	1.0	200m	50*					
1N455	G			S	30	1.0	300m	30*					
1N456	S			S	25	1.0	40m	25n					
1N456A	S			S	25	1.0	100m	25n					
1N457	S			S	60	1.0	20m	25n					
1N457A	S			S	60	1.0	100m	25n					
1N458	S			S	125	1.0	2.0m	25n					
1N458A	S			S	125	1.0	100m	25n					
1N459	S			S	175	1.0	3.0m	25n					
1N459A	S			S	175	1.0	100m	25n					
1N460	S			S	90	1.0	5.0m	0.1*					
1N460A	S			S	90	1.0	15m	0.1*					
1N461	S			S	25	1.0	15m	0.5*					
1N461A	S			S	25	1.0	100m	0.5*					
1N462	S			S	60	1.0	5.0m	0.5*					
1N462A	S			S	60	1.0	100m	0.5*					
1N463	S			S	175	1.0	1.0m	0.5*					
1N463A	S			S	175	1.0	100m	0.5*					
1N464	S			S	125	1.0	3.0m	0.5*					
1N464A	S			S	125	1.0	100m	0.5*					
1N465	S	1N5223A	1N5221	Z						3.2	5.0		200m
1N465A	S	1N5223B	1N5221	Z						2.7	5.0	5.0	200m
1N465B	S			Z						2.7	5.0	1.0	200m
1N466	S	1N5226A	1N5221	Z						3.9	5.0		200m
1N466A	S	1N5226B	1N5221	Z						3.3	5.0	5.0	200m
1N466B	S			Z						3.3	5.0	1.0	200m
1N467	S	1N5228B	1N5221	Z						4.5	5.0		200m
1N467A	S	1N5228B	1N5221	Z						3.9	5.0	5.0	200m
1N467B	S			Z						3.9	5.0	1.0	200m
1N468	S	1N5230A	1N5221	Z						5.4	5.0		200m
1N468A	S	1N5230B	1N5221	Z						4.7	5.0	5.0	200m
1N468B	S			Z						4.7	5.0	1.0	200m
1N469	S	1N5232B	1N5221	Z						6.4	5.0		200m
1N469A	S	1N5232B	1N5221	Z						5.6	5.0	5.0	200m
1N469B	S			Z						5.6	6.0	1.0	200m
1N470	S	1N5235B	1N5221	Z						8.0	5.0		200m
1N470A	S	1N5235B	1N5221	Z						6.8	5.0	5.0	200m
1N470B	S			C						6.8	5.0	1.0	200m
1N471	S			C						3.9	5.0		200m
1N471A	S			C						3.3	5.0	5.0	200m
1N472	S			C						4.5	5.0		200m
1N472A	S			C						3.9	5.0	5.0	200m
1N473	S			C						5.4	5.0		200m
1N473A	S			C						4.7	5.0	5.0	200m
1N474	S			C						6.4	5.0		200m
1N474A	S			C						5.6	5.0	5.0	200m
1N475	S			C						8.0	5.0		150m
1N475A	S			C						6.8	5.0	5.0	200m
1N476	G			S	90	1.0	2.5m	11*					
1N477	G			S	90	1.0	2.5m	11*					
1N478	G			S	90	1.0	5.0m	7.0*					
1N479	G			S	90	1.0	5.0m	7.0*					
1N480	G			S	60	1.0	5.0m		0.5				
1N481	G			G	200	0.5	0.1	1.9	25				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N482	S			S	36	1.1	100m	0.25*					
1N482A	S			S	36	1.0	100m	25n					
1N482B	S			S	36	1.0	100m	25n					
1N483	S			S	70	1.0	100m	25n					
1N483A	S			S	70	1.0	100m	25n					
1N483B	S			S	70	1.0	100m	25n					
1N484	S			S	130	1.1	100m	0.25*					
1N484A	S			S	130	1.0	100m	25n					
1N484B	S			S	130	1.0	100m	25n					
1N485	S			S	180	1.1	100m	0.25*					
1N485A	S			S	180	1.0	100m	25n					
1N485B	S			S	180	1.0	100m	25n					
1N486	S			S	225	1.1	100m	0.25*					
1N486A	S			S	225	1.0	100m	0.05*					
1N486B	S			S	225	1.0	100m	0.05*					
1N487	S			S	300	1.1	100m	0.25*					
1N487A	S			S	300	1.0	100m	0.1*					
1N487B	S			S	300	1.0	100m	0.1*					
1N488	S			S	380	1.1	100m	0.25*					
1N488A	S			S	380	1.0	100m	0.1*					
1N488B	S			S	380	1.0	100m	0.1*					
1N490	G			S	90	1.0	5.0m		0.5				
1N497	G			S	30	1.0	100m	20*					
1N498	G			S	60	1.0	100m	25*					
1N499	G			S	75	1.0	100m	30*					
1N500	G			S	80	1.0	100m	40*					
1N501	G			S	100	1.0	100m	40*					
1N502	G			S	120	1.0	100m	50*					
1N503	S	1N4001	1N4001	G	50	1.2	0.33	0.5					
1N504	S	1N4002	1N4001	G	100	1.2	0.33	0.5					
1N505	S	1N4003	1N4001	G	200	1.2	0.33	0.5					
1N506	S	1N4004	1N4001	G	300	1.2	0.33	0.5					
1N507	S	1N4004	1N4001	G	400	1.2	0.33	0.25					
1N508	S	1N4005	1N4001	G	600	1.2	0.33	0.25					
1N509	S	1N4006	1N4001	G	800	1.2	0.33	0.25					
1N510	S	1N4007	1N4001	G	1000	1.2	0.33	0.25					
1N511	S	1N4001	1N4001	G	50	1.2	1.0	0.5					
1N512	S	1N4002	1N4001	G	100	1.2	1.0	0.5					
1N513	S	1N4003	1N4001	G	200	1.2	1.0	0.5					
1N514	S	1N4004	1N4001	G	300	1.2	1.0	0.5					
1N515	S	1N4004	1N4001	G	400	1.2	1.0	0.25					
1N516	S	1N4005	1N4001	G	600	1.2	1.0	0.25					
1N517	S	1N4006	1N4001	G	800	1.2	1.0	0.25					
1N518	S	1N4007	1N4001	G	1000	1.2	1.0	0.25					
1N519	S	1N4001	1N4001	G	50	1.2	1.25	0.5					
1N520	S	1N4002	1N4001	G	100	1.2	1.25	0.5					
1N521	S	1N4003	1N4001	G	200	1.2	1.25	0.5					
1N522	S	1N4004	1N4001	G	300	1.2	1.25	0.5					
1N523	S	1N4004	1N4001	G	400	1.2	1.25	0.25					
1N524	S	1N4005	1N4001	G	600	1.2	1.25	0.25					
1N525	S	1N4006	1N4001	G	800	1.2	1.25	0.25					
1N526	S	1N4007	1N4001	G	1000	1.2	1.25	0.25					
1N527	G			S	10	0.3	1.0m	50*					
1N530	S	1N4002	1N4001	G	100	2.0	0.3	0.003	3.0				
1N531	S	1N4003	1N4001	G	200	2.0	0.3		3.0				
1N532	S	1N4004	1N4001	G	300	2.0	0.3	0.01	3.0				
1N533	S	1N4004	1N4001	G	400	2.0	0.3	0.015	3.0				
1N534	S	1N4005	1N4001	G	500	2.0	0.3		3.0				
1N535	S	1N4005	1N4001	G	600	2.0	0.3	0.02	3.0				
1N536	S	1N4001	1N4001	G	50	0.5	0.25	0.4	15				
1N537	S	1N4002	1N4001	G	100	0.4	0.25	0.5	15				
1N538	S	1N4003	1N4001	G	200	0.3	0.25	0.5	15				
1N539	S	1N4004	1N4001	G	300	0.5	0.25	0.3	15				
1N540	S	1N4004	1N4001	G	400	0.5	0.25	0.3	15				
1N541	G			S	45	2.2	10m	18*					
1N542	G			S									
1N543	S	MR991A	MR990A	G	1200	10	0.01	0.1					
1N543A	S			G	1200	8.0	0.035	0.1					
1N544	S			G	1000	10	0.015	0.1					
1N544A	S			G	1000	10	0.075	0.1					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N547	S	1N4005	1N4001	G	600	1.1	0.25	0.35	15				
1N548	S	1N4007	1N4001	G	900	1.1	0.3	0.35	15				
1N549	S	MR1-1200	MR1-1200	G	1200	1.1	0.3	0.35	15				
1N550	S	MR1121	MR1120	G	100	1.5	0.5		4.0				
1N551	S	MR1122	MR1120	G	200	1.5	0.5	0.001	4.0				
1N552	S	MR1123	MR1120	G	300	1.5	0.5		4.0				
1N553	S	MR1124	MR1120	G	400	1.5	0.5		4.0				
1N554	S	MR1125	MR1120	G	500	1.5	0.5		4.0				
1N555	S	MR1126	MR1120	G	600	1.5	0.5	0.005	4.0				
1N560	S	1N4006	1N4001	G	800	1.75	0.25	0.015	2.0				
1N561	S	1N4007	1N4001	G	1000	1.75	0.25	0.02	2.0				
1N562	S	MR1128	MR1120	G	800	1.75	0.4	0.015	3.0				
1N563	S	MR1130	MR1120	G	1000	1.75	0.4	0.02	3.0				
1N566	G			S	220	1.0	20m	0.2m					
1N567	G			S	100	1.0	150m	0.15m	0.3				
1N568	G			S	7.0	0.32	5.0m	0.1m	0.08				
1N569	G			S	12	0.5	250m	0.05m					
1N570	S			G	1250	10	37.5	0.1					
1N571	G			S		1.0	200m	100*	4.0				
1N573	G			G	380	0.15	0.25						
1N574	G			G	380	0.15	0.3						
1N575	G			G	380	0.3	0.35						
1N575A	G			G	380	0.15	0.35						
1N576A	G			G	380	0.15	0.4						
1N581	G			G	380	0.15	0.25						
1N582	G			G	380	0.15	0.3						
1N583	G			G	380	0.15	0.35						
1N584	G			G	380	0.15	0.4						
1N588	S	MR991A	MR990A	G	1500	1.75	0.1	0.1	5.0				
1N589	S	MR991A	MR990A	G	1500	1.75	0.25	0.1	10				
1N590	S			G	1500	8.0	0.075	0.1					
1N591	S			G	1500	8.0	0.075	0.1					
1N596	S	1N4005	1N4001	G	600	3.0	0.125	0.025	1.0				
1N597	S	1N4006	1N4001	G	800	3.0	0.125	0.025	1.0				
1N598	S	1N4007	1N4001	G	1000	3.0	0.125	0.025	1.0				
1N599	S	1N4001	1N4001	G	50	1.5	0.3	0.025	2.0				
1N599A	S	1N4001	1N4001	G	50	1.5	0.3	0.001	2.0				
1N600	S	1N4002	1N4001	G	100	1.5	0.3	0.025	2.0				
1N600A	S	1N4002	1N4001	G	100	1.5	0.3	0.001	2.0				
1N601	S	1N4003	1N4001	G	150	1.5	0.3	0.025	2.0				
1N601A	S	1N4003	1N4001	G	150	1.5	0.3	0.001	2.0				
1N602	S	1N4003	1N4001	G	200	1.5	0.3	0.025	2.0				
1N602A	S	1N4003	1N4001	G	200	1.5	0.3	0.001	2.0				
1N603	S	1N4004	1N4001	G	300	1.5	0.3	0.025	2.0				
1N603A	S	1N4004	1N4001	G	300	1.5	0.3	0.001	2.0				
1N604	S	1N4004	1N4001	G	400	1.5	0.3	0.025	2.0				
1N604A	S	1N4004	1N4001	G	400	1.5	0.3		2.0				
1N605	S	1N4005	1N4001	G	500	1.5	0.3	0.025	2.0				
1N605A	S	1N4005	1N4001	G	500	1.5	0.3	0.002	2.0				
1N606	S	1N4005	1N4001	G	600	1.5	0.3	0.025	2.0				
1N606A	S	1N4005	1N4001	G	600	1.5	0.3		2.0				
1N607	S	MR1120	MR1120	G	50	1.5	0.8	0.025	3.0				
1N607A	S	MR1120	MR1120	G	50	1.5	0.8	0.001	3.0				
1N608	S	MR1121	MR1120	G	100	1.5	0.8	0.025	3.0				
1N608A	S	MR1121	MR1120	G	100	1.5	0.8	0.001	3.0				
1N609	S	MR1122	MR1120	G	150	1.5	0.8	0.025	3.0				
1N609A	S	MR1122	MR1120	G	150	1.5	0.8	0.001	3.0				
1N610	S	MR1122	MR1120	G	200	1.5	0.8	0.025	3.0				
1N610A	S	MR1122	MR1120	G	200	1.5	0.8	0.001	3.0				
1N611	S	MR1123	MR1120	G	300	1.5	0.8	0.025	3.0				
1N611A	S	MR1123	MR1120	G	300	1.5	0.8	0.001	3.0				
1N612	S	MR1124	MR1120	G	400	1.5	0.8	0.025	3.0				
1N612A	S	MR1124	MR1120	G	400	1.5	0.8	1.5	3.0				
1N613	S	MR1125	MR1120	G	500	1.5	0.8	0.025	3.0				
1N613A	S	MR1125	MR1120	G	500	1.5	0.8	0.002	3.0				
1N614	S	MR1126	MR1120	G	600	1.5	0.8	0.025	3.0				
1N614A	S	MR1126	MR1120	G	600	1.5	0.8	2.5	3.0				
1N615	G			G	300		0.075	1.2	25				
1N616	G			S	20	1.0	8.0m	0.4m					
1N617	G			S	115	1.0	3.0m	11*					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N618	G			S	115	1.0	5.0m	7.0*					
1N619	S			S	30	1.0	3.0m	0.08*					
1N622	S			S	150	1.0	7.0m	0.16*					
1N625	S			S		1.5	4.0m	1.0*	1.0				
1N626	S			S		1.5	4.0m	1.0*	1.0				
1N627	S			S		1.5	4.0m	1.0*	1.0				
1N628	S			S		1.5	4.0m	1.0*	1.0				
1N629	S			S		1.5	4.0m	1.0*	1.0				
1N630	S			M									
1N631	G			S	60				0.3				
1N632	G			S	60	1.0	7.0m		0.3				
1N633	G			S	80	1.0	125m		0.3				
1N634	G			S	100	1.0	50m	45*					
1N635	G			S	150	1.0	50m	175*					
1N636	G			S	60	1.0	2.5m	10*					
1N643	S			S	175	1.0	10m	1.0*	0.3				
1N643A	S			S	175	1.0	100m	1.0*	0.3				
1N645	S	1N4003	1N4001	S	225	1.0	400m	0.2*					
1N645A	S	1N4003	1N4001	S	225	1.0	400m	0.05*					
1N646	S	1N4004	1N4001	S	300	1.0	400m	0.2*					
1N647	S	1N4004	1N4001	S	400	1.0	400m	0.2*					
1N648	S	1N4005	1N4001	S	500	1.0	400m	0.2*					
1N649	S	1N4005	1N4001	S	600	1.0	400m	0.2*					
1N658	S			S	100	1.0	100m	0.05*	0.3				
1N658A	S			S	120	1.0	100m	25n	0.3				
1N659	S			S	50	1.0	6.0m	5.0*	0.3				
1N659A	S			S	60	1.0	10m	25n	0.3				
1N660	S			S	100	1.0	6.0m	5.0*	0.3				
1N660A	S			S	120	1.0	10m	25n	0.3				
1N661	S			S	200	1.0	6.0m	10*	0.3				
1N661A	S			S	240	1.0	10m	25n	0.3				
1N662	S			S	80	1.0	10m	1.0*	0.5				
1N662A	S			S	80	1.0	100m	1.0*	0.3				
1N663	S			S	80	1.0	100m	5.0*	0.5				
1N663A	S			S	80	1.0	100m	0.1*	0.3				
1N664	S	1N5237A	1N5221	Z						8.2	10	10	25m
1N665	S	1N5242A	1N5221	Z						12	10	10	0.25W
1N666	S	1N5245B	1N5221	Z						15	5.0	5.0	0.25W
1N667	S	1N5248A	1N5221	Z						18	5.0	10	0.25W
1N668	S	1N5251A	1N5221	Z						22	5.0	10	0.25W
1N669	S	1N5254A	1N5221	Z						27	5.0	10	0.25W
1N670	S	1N5266B	1N5221	Z						68	1.0	5.0	250m
1N671	S	1N5271A	1N5221	Z						100	1.0	10	0.25W
1N672	S	1N5276A	1N5221	Z						150	1.0	10	0.25W
1N673	S		1N5221	S	350	1.0	250m	1.0*					
1N674	S	1N5230A	1N5221	Z						4.7	20	10	250m
1N675	S	1N5234B	1N5221	Z						6.2	20	5.0	250m
1N676	S	1N4002	1N4001	G	100	1.0	0.075	0.2	3.0				
1N677	S	1N4002	1N4001	G	100	1.0	0.15	0.2	5.0				
1N678	S	1N4003	1N4001	G	200	1.0	0.075	0.2	3.0				
1N679	S	1N4003	1N4001	G	200	1.0	0.15	0.2	5.0				
1N681	S	1N4004	1N4001	G	300	1.0	0.075	0.2	3.0				
1N682	S	1N4004	1N4001	G	300	1.0	0.15	0.2	5.0				
1N683	S	1N4004	1N4001	G	400	1.0	0.075	0.2	3.0				
1N684	S	1N4004	1N4001	G	400	1.0	0.15	0.2	5.0				
1N685	S	1N4005	1N4001	G	500	1.0	0.075	0.2	3.0				
1N686	S	1N4005	1N4001	G	500	1.0	0.15	0.2	5.0				
1N687	S	1N4005	1N4001	G	600	1.0	0.075	0.2	3.0				
1N689	S	1N4005	1N4001	G	600	1.0	0.15	0.2	5.0				
1N690	S			S	36	1.0	400m	0.25*	0.8				
1N691	S			S	70	1.0	400m	0.25*	0.8				
1N692	S			S	100	1.0	400m	0.25*	0.8				
1N693	S			S	130	1.0	400m	0.25*	0.8				
1N695	G			S	20	1.0	100m	2.0*	0.3				
1N695A	G			S	25	0.5	10m	2.0*	0.3				
1N696	S			S	30	1.0	10m	15n	5.0				
1N697	S			S		1.0	0.25	1.0*					
1N698	G			S	25	0.65	30m	160*	0.5				
1N699	G			S	80	1.0	100m		0.3				
1N701	S	1N5240B	1N5221	Z						10.5	10		250m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N702	S	1N5223A	1N5221	Z						3.2	5.0		250m
★1N702A	S	1N5223B	1N5221	Z						2.9	5.0		250m
★1N703	S	1N5227A	1N5221	Z						3.9	5.0		250m
★1N703A	S	1N5227B	1N5221	Z						3.67	5.0		250m
★1N704	S	1N5229A	1N5221	Z						4.5	5.0		250m
★1N704A	S	1N5229B	1N5221	Z						4.3	5.0		250m
★1N705	S	1N5230A	1N5221	Z						5.4	5.0		250m
★1N705A	S	1N5230B	1N5221	Z						5.12	5.0		250m
★1N706	S	1N5232A	1N5221	Z						6.4	5.0		250m
★1N706A	S	1N5232B	1N5221	Z						6.1	5.0		250m
★1N707	S	1N5236A	1N5221	Z						8.0	5.0		250m
★1N707A	S	1N5236B	1N5221	Z						7.55	5.0		250m
★1N708	S	1N5232A	1N5221	Z							25	10	250m
★1N708A	S	1N5232B	1N5221	Z							25	5.0	250m
★1N709	S	1N5234A	1N5221	Z							25	10	250m
★1N709A	S	1N5234B	1N5221	Z							25	5.0	250m
★1N710	S	1N5235A	1N5221	Z							25	10	250m
★1N710A	S	1N5235B	1N5221	Z							25	5.0	250m
★1N711	S	1N5236A	1N5221	Z							25	10	250m
★1N711A	S	1N5236B	1N5221	Z							25	5.0	250m
★1N712	S	1N5237A	1N5221	Z							25	10	250m
★1N712A	S	1N5237B	1N5221	Z							25	5.0	250m
★1N713	S	1N5239A	1N5221	Z							12	10	250m
★1N713A	S	1N5239B	1N5221	Z							12	5.0	250m
★1N714	S	1N5240A	1N5221	Z							12	10	250m
★1N714A	S	1N5240B	1N5221	Z							12	5.0	250m
★1N715	S	1N5241A	1N5221	Z							12	10	250m
★1N715A	S	1N5241B	1N5221	Z							12	5.0	250m
★1N716	S	1N5242A	1N5221	Z							12	10	250m
★1N716A	S	1N5242B	1N5221	Z							12	5.0	250m
★1N717	S	1N5243A	1N5221	Z							12	10	250m
★1N717A	S	1N5243B	1N5221	Z							12	5.0	250m
★1N718	S	1N5245A	1N5221	Z							12	10	250m
★1N718A	S	1N5245B	1N5221	Z							12	5.0	250m
★1N719	S	1N5246A	1N5221	Z							12	10	250m
★1N719A	S	1N5246B	1N5221	Z							12	5.0	250m
★1N720	S	1N5248A	1N5221	Z							12	10	250m
★1N720A	S	1N5248B	1N5221	Z							12	5.0	250m
★1N721	S	1N5250A	1N5221	Z							4.0	10	250m
★1N721A	S	1N5250B	1N5221	Z							4.0	5.0	250m
★1N722	S	1N5251A	1N5221	Z						22	4.0	10	250m
★1N722A	S	1N5251B	1N5221	Z						22	4.0	5.0	250m
★1N723	S	1N5252A	1N5221	Z						24	4.0	10	250m
★1N723A	S	1N5252B	1N5221	Z						24	4.0	5.0	250m
★1N724	S	1N5254A	1N5221	Z						27	4.0	10	250m
★1N724A	S	1N5254B	1N5221	Z						27	4.0	5.0	250m
★1N725	S	1N5256A	1N5221	Z						30	4.0	10	250m
★1N725A	S	1N5256B	1N5221	Z						30	4.0	5.0	250m
★1N726	S	1N5257A	1N5221	Z						33	4.0	10	250m
★1N726A	S	1N5257B	1N5221	Z						33	4.0	5.0	250m
★1N727	S	1N5258A	1N5221	Z						36	4.0	10	250m
★1N727A	S	1N5258B	1N5221	Z						36	4.0	5.0	250m
★1N728	S	1N5259A	1N5221	Z						39	4.0	10	250m
★1N728A	S	1N5259B	1N5221	Z						39	4.0	5.0	250m
★1N729	S	1N5260A	1N5221	Z						43	4.0	10	250m
★1N729A	S	1N5260B	1N5221	Z						43	4.0	5.0	250m
★1N730	S	1N5261A	1N5221	Z						47	4.0	10	250m
★1N730A	S	1N5261B	1N5221	Z						47	4.0	5.0	250m
★1N731	S	1N5262A	1N5221	Z						51	4.0	10	250m
★1N731A	S	1N5262B	1N5221	Z						51	4.0	5.0	250m
★1N732	S	1N5263A	1N5221	Z						56	4.0	10	250m
★1N732A	S	1N5263B	1N5221	Z						56	4.0	5.0	250m
★1N733	S	1N5265A	1N5221	Z						62	2.0	10	250m
★1N733A	S	1N5265B	1N5221	Z						62	2.0	5.0	250m
★1N734	S	1N5266A	1N5221	Z						68	2.0	10	250m
★1N734A	S	1N5266B	1N5221	Z						68	2.0	5.0	250m
★1N735	S	1N5267A	1N5221	Z						75	2.0	10	250m
★1N735A	S	1N5267B	1N5221	Z						75	2.0	5.0	250m
★1N736	S	1N5268A	1N5221	Z						82	2.0	10	250m
★1N736A	S	1N5268B	1N5221	Z						82	2.0	5.0	250m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N737	S	1N5270A	1N5221	Z						91	1.0	10	250m
★1N737A	S	1N5270B	1N5221	Z						91	1.0	5.0	250m
★1N738	S	1N5271A	1N5221	Z						100	1.0	10	250m
★1N738A	S	1N5271B	1N5221	Z						100	1.0	5.0	250m
★1N739	S	1N5272A	1N5221	Z						110	1.0	10	250m
★1N739A	S	1N5272B	1N5221	Z						110	1.0	5.0	250m
★1N740	S	1N5273A	1N5221	Z						120	1.0	10	250m
★1N740A	S	1N5273B	1N5221	Z						120	1.0	5.0	250m
★1N741	S	1N5274A	1N5221	Z						130	1.0	10	250m
★1N741A	S	1N5274B	1N5221	Z						130	1.0	5.0	250m
★1N742	S	1N5276A	1N5221	Z						150	1.0	10	250m
★1N742A	S	1N5276B	1N5221	Z						150	1.0	5.0	250m
★1N743	S	1N5277A	1N5221	Z						160	1.0	10	250m
★1N743A	S	1N5277B	1N5221	Z						160	1.0	5.0	250m
★1N744	S	1N5279A	1N5221	Z						180	1.0	10	250m
★1N744A	S	1N5279B	1N5221	Z						180	1.0	5.0	250m
★1N745	S	1N5281A	1N5221	Z						200	1.0	0	250m
★1N745A	S	1N5281B	1N5221	Z						200	1.0	5.0	250m
★1N746	S		1N746	Z						3.3	20	10	400m
★1N746A	S		1N746	Z						3.3	20	5.0	400m
★1N747	S		1N746	Z						3.6	20	10	400m
★1N747A	S		1N746	Z						3.6	20	5.0	400m
★1N748	S		1N746	Z						3.9	20	10	400m
★1N748A	S		1N746	Z						3.9	20	5.0	400m
★1N749	S		1N746	Z						4.3	20	10	400m
★1N749A	S		1N746	Z						4.3	20	5.0	400m
★1N750	S		1N746	Z						4.7	20	10	400m
★1N750A	S		1N746	Z						4.7	20	5.0	400m
★1N751	S		1N746	Z						5.1	20	10	400m
★1N751A	S		1N746	Z						5.1	20	5.0	400m
★1N752	S		1N746	Z						5.6	20	10	400m
★1N752A	S		1N746	Z						5.6	20	5.0	400m
★1N753	S		1N746	Z						6.2	20	10	400m
★1N753A	S		1N746	Z						6.2	20	5.0	400m
★1N754	S		1N746	Z						6.8	20	10	400m
★1N754A	S		1N746	Z						6.8	20	5.0	400m
★1N755	S		1N746	Z						7.5	20	10	400m
★1N755A	S		1N746	Z						7.5	20	5.0	400m
★1N756	S		1N746	Z						8.2	20	10	400m
★1N756A	S		1N746	Z						8.2	20	5.0	400m
★1N757	S		1N746	Z						9.1	20	10	400m
★1N757A	S		1N746	Z						9.1	20	5.0	400m
★1N758	S		1N746	Z						10.0	20	10	400m
★1N758A	S		1N746	Z						10.0	20	5.0	400m
★1N759	S		1N746	Z						12.0	20	10	400m
★1N759A	S		1N746	Z						12.0	20	5.0	400m
★1N761	S	1N5230A	1N5221	Z						5.4	10		250m
★1N762	S	1N5232B	1N5221	Z						6.4	10		250m
★1N763	S	1N5238B	1N5221	Z						8.0	10		250m
★1N764	S	1N5238A	1N5221	Z						10.0	10		250m
★1N765	S	1N5240A	1N5221	Z						12.0	5.0		250m
★1N766	S	1N5243A	1N5221	Z						14.5	5.0		250m
★1N767	S	1N5246A	1N5221	Z						18	5.0		250m
★1N768	S	1N5249A	1N5221	Z						21	5.0		250m
★1N769	S	1N5252A	1N5221	Z						27	5.0		250m
1N770	G			S	20	0.42	5.0m	40*	0.35				
1N771	G			S	80	1.0	100m	25*					
1N771A	G			S	80	1.0	200m	25*					
1N771B	G			S	80	1.0	400m	25*					
1N772	G			S	70	1.0	100m	50*					
1N772A	G			S	70	1.0	200m	50*					
1N773	G			S	65	1.0	100m	10*					
1N773A	G			S	65	1.0	200m	10*					
1N774	G			S	60	1.0	100m	15*					
1N774A	G			S	60	1.0	200m	15*					
1N775	G			S	60	1.0	100m	20*					
1N776	G			S	20	1.0	50m	200*					
1N777	G			S	60	1.0	100m	25*	3.5				
1N778	S			S	100	1.0	10m	0.5*	0.3				
1N779	S			S	175	1.0	10m	0.5*	0.3				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS: V_{RWM} Volts SIGNAL DIODES: PRV Volts	RECTIFIERS: V_F Volts SIGNAL DIODES: V_F Volts @	RECTIFIERS: I_O Amp SIGNAL DIODES: I_F	RECTIFIERS: I_R mA SIGNAL DIODES: I_R	RECTIFIERS: I_{FSM} Amp SIGNAL DIODES: t_{rr} µs	ZENER DIODES: V_Z Nom Volts REFERENCE DIODES: V_Z Nom Volts	ZENER DIODES: I_{ZT} mA REFERENCE DIODES: T_C %/°C	ZENER DIODES: Tol V_Z ±% REFERENCE DIODES: I_{ZT} mA	ZENER DIODES: P_D REFERENCE DIODES: Temp Range °C
1N781	G			S	40	0.45	10m	5.0*	0.5				
1N781A	G			S	40	0.45	10m	5.0*	0.5				
1N789	S			S		1.0	10m	1.0*	0.5				
1N790	S			S		1.0	10m	5.0*	0.25				
1N791	S			S		1.0	50m	5.0*	0.5				
1N792	S			S		1.0	100m	5.0*	0.5				
1N793	S			S		1.0	10m	1.0*	0.5				
1N794	S			S		1.0	10m	5.0*	0.25				
1N795	S			S		1.0	50m	5.0*	0.5				
1N796	S			S		1.0	100m	5.0*	0.5				
1N797	S			S		1.0	10m	1.0*	0.5				
1N798	S			S		1.0	10m	5.0*	0.25				
1N799	S			S		1.0	50m	5.0*	0.5				
1N800	S			S		1.0	100m	5.0*	0.5				
1N801	S			S		1.0	10m	1.0*	0.5				
1N802	S			S		1.0	50m	5.0*	0.5				
1N803	S			S		1.0	10m	5.0*	0.5				
1N804	S			S		1.0	50m	10*	0.5				
1N805	G			S	40	1.0	3.0m	100*					
1N806	S			S	100	1.0	4.0m	0.5*	0.3				
1N807	S			S	180	1.0	4.0m	0.5*	0.3				
1N808	S			S	100	1.0	100m	1.0*	0.3				
1N809	S			S	200	1.0	100m	1.0*	0.3				
1N810	S			S	50	1.0	10m	1.0*	50				
1N811	S			S	20	1.0	1.0m	1.0*	0.25				
1N812	S			S	30	1.0	1.0m	0.1*	0.25				
1N813	S			S	15	1.0	5.0m	0.5*	0.25				
1N814	S			S	40	1.0	2.0m	0.1*	0.25				
1N815	S			S	15	1.5	100m	0.5*	0.25				
1N816	S			S	6.0	1.0	100m	0.1*					
1N817	S			S	200	1.5	6.0m	20*	1.0				
1N818	S			S	80	1.5	30m	0.25*	0.5				
1N819	S			S	80	1.0	200m	25n					
★1N821	S		1N821	R						6.2	0.01	7.5	-55/100
★1N821A	S		1N821	R						6.2	0.01	7.5	-55/100
1N822	S			R						6.2	0.01	7.5	-55/100
★1N823	S		1N821	R						6.2	0.005	7.5	-55/100
★1N823A	S		1N821	R						6.2	0.005	7.5	-55/100
1N824	S			R						6.2	0.005	7.5	-55/100
★1N825	S		1N821	R						6.2	0.002	7.5	-55/100
★1N825A	S		1N821	R						6.2	0.002	7.5	-55/100
1N826	S	1N825	1N821	R						6.5	0.002	7.5	-55/100
★1N827	S		1N821	R						6.2	0.001	7.5	-55/100
★1N827A	S		1N821	R						6.2	0.001	7.5	-55/100
1N828	S	1N827	1N821	R						6.5	0.001	7.5	-55/100
★1N829	S		1N821	R						6.2	0.0005	7.5	-55/100
1N830	S		Table 4	M									
1N830A	S		Table 4	M									
1N831	S		Table 4	M									
1N831A	S		Table 4	M									
1N831B	S		Table 4	M									
1N832	S		Table 4	M									
1N832A	S		Table 4	M									
1N832B	S		Table 4	M									
1N832D			Table 4	M									
1N833	S		Table 4	M									
1N833A	S		Table 4	M									
1N835	G			S	30	0.5	5.0m	20*	0.5				
1N836	G			S	5.0								
1N837	S			S		1.0	150m	0.1*	0.5				
1N837A	S			S		1.0	150m	0.1*	0.3				
1N838	S			S		1.0	150m	0.1*	0.5				
1N839	S			S		1.0	150m	0.1*	0.5				
1N840	S			S		1.0	150m	0.1*	0.3				
1N841	S			S		1.0	150m	0.1*	0.3				
1N842	S			S		1.0	150m	0.1*	0.3				
1N843	S			S		1.0	150m	0.1*	0.3				
1N844	S			S		1.0	200m	0.1*	0.5				
1N845	S			S		1.0	200m	0.1*	0.5				
1N846	S	1N4001	1N4001	G	**50**	**0.6**	**200m**	**20***					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N847	S	1N4002	1N4001	G	100	0.6	200m	20*					
1N848	S	1N4003	1N4001	G	200	0.6	200m	20*					
1N849	S	1N4004	1N4001	G	300	0.6	200m	20*					
1N850	S	1N4004	1N4001	G	400	0.6	200m	20*					
1N851	S	1N4005	1N4001	G	500	0.6	200m	20*					
1N852	S	1N4005	1N4001	G	600	0.6	200m	20*					
1N853	S	1N4006	1N4001	G	700	0.6	200m	20*					
1N854	S	1N4006	1N4001	G	800	0.6	200m	20*					
1N855	S	1N4007	1N4001	G	900	0.6	200m	20*					
1N856	S	1N4007	1N4001	G	1.0k	0.6	200m	20*					
1N857	S	1N4001	1N4001	G	50	0.6	150m	20*					
1N858	S	1N4002	1N4001	G	100	0.6	150m	20*					
1N859	S	1N4003	1N4001	G	200	0.6	150m	20*					
1N860	S	1N4004	1N4001	G	300	0.6	150m	20*					
1N861	S	1N4004	1N4001	G	400	0.6	150m	20*					
1N862	S	1N4005	1N4001	G	500	0.6	150m	20*					
1N863	S	1N4005	1N4001	G	600	0.6	150m	20*					
1N864	S	1N4006	1N4001	G	700	0.6	150m	20*					
1N865	S	1N4006	1N4001	G	800	0.6	150m	20*					
1N866	S	1N4007	1N4001	G	900	0.6	150m	20*					
1N867	S	1N4007	1N4001	G	1.0k	0.6	150m	20*					
1N868	S	1N4001	1N4001	G	50	0.6	100m	20*					
1N869	S	1N4002	1N4001	G	100	0.6	100m	20*					
1N870	S	1N4003	1N4001	G	200	0.6	100m	20*					
1N871	S	1N4004	1N4001	G	300	0.6	100m	20*					
1N872	S	1N4004	1N4001	G	400	0.6	100m	20*					
1N873	S	1N4005	1N4001	G	500	0.6	100m	20*					
1N874	S	1N4005	1N4001	G	600	0.6	100m	20*					
1N875	S	1N4006	1N4001	G	700	0.6	100m	20*					
1N876	S	1N4006	1N4001	G	800	0.6	100m	20*					
1N877	S	1N4007	1N4001	G	900	0.6	100m	20*					
1N878	S	1N4007	1N4001	G	1.0k	0.6	100m	20*					
1N879	S	1N4001	1N4001	G	50	0.6	50m	20*					
1N880	S	1N4002	1N4001	G	100	0.6	50m	20*					
1N881	S	1N4003	1N4001	G	200	0.6	50m	20*					
1N882	S	1N4004	1N4001	G	300	0.6	50m	20*					
1N883	S	1N4004	1N4001	G	400	0.6	50m	20*					
1N884	S	1N4005	1N4001	G	500	0.6	50m	20*					
1N885	S	1N4005	1N4001	G	600	0.6	50m	20*					
1N886	S	1N4006	1N4001	G	700	0.6	50m	20*					
1N887	S	1N4006	1N4001	G	800	0.6	50m	20*					
1N888	S	1N4007	1N4001	G	900	0.6	50m	20*					
1N889	S	1N4007	1N4001	G	1.0k	0.6	50m	20*					
1N890	S			S	60	1.0	20m	25n					
1N891	S			S		1.0	50m	0.1*	0.3				
1N892	S			S		1.0	50m	0.1*	0.3				
1N893	S			S		1.0	50m	0.1*	0.3				
1N894	G			S	5.0								
1N895	G			S	5.0								
1N896	G			S	5.0								
1N897	S			S	2.5	1.0	5.0m	0.1*	1.0				
1N898	S			S	2.5	1.0	100m	5.0*	0.3				
1N899	S			S	85	1.0	5.0m	0.1*	0.3				
1N900	S			S	85	1.0	50m	0.1*	0.3				
1N901	S			S	85	1.0	100m	0.5*	0.3				
1N902	S			S	170	1.0	10m	1.0*	0.3				
1N903	S			S	40	1.0	10m	0.1*	4.0				
1N903A	S			S	40	1.0	20m	0.1*	4.0				
1N904	S			S	30	1.0	10m	0.1*	4.0				
1N904A	S			S	30	1.0	20m	0.1*	4.0				
1N905	S			S	20	1.0	10m	0.1*	4.0				
1N905A	S			S	20	1.0	20m	0.1*	4.0				
1N906	S			S	20	1.0	10m	0.1*	4.0				
1N906A	S			S	20	1.0	20m	0.1*	4.0				
1N907	S			S	30	1.0	10m	0.1*	4.0				
1N907A	S			S	30	1.0	20m	0.1*	4.0				
1N908	S			S	40	1.0	10m	0.1*	4.0				
1N908A	S			S	40	1.0	20m	0.1*	4.0				
1N909	G			S	50	1.0	100m	10*					
1N910	G			S	30	1.0	100m	10*					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N911	G			S	20	1.0	100m	10*					
1N912	S			S	10	0.62	1.0m	1.0*					
1N912A	S			S	10	0.62	1.0m	1.0*					
1N913	S			S	10	0.62	1.0m	5.0*					
1N913A	S			S	10	0.62	1.0m	1.0*					
1N914	S			S	75	1.0	10m	5.0*	4.0				
1N914A	S			S	75	1.0	20m	5.0*	4.0				
1N914B	S			S	75	1.0	100m	5.0*	4.0				
1N915	S			S	50	1.0	50m	5.0*	10				
1N916	S			S	75	1.0	10m	5.0*	4.0				
1N916A	S			S	75	1.0	20m	5.0*	4.0				
1N916B	S			S	75	1.0	30m	5.0*	4.0				
1N917	S			S	30	1.0	10m	0.05*	3.0				
1N918	S		Table 4	M									
1N919	S			S	150	1.0	100m	0.5*	0.3				
1N920	S			S	36	1.0	500m	0.25*	0.3				
1N921	S			S	70	1.0	500m	0.25*	0.3				
1N922	S			S	100	1.0	500m	0.25*	0.3				
1N923	S			S	130	1.0	500m	0.25*	0.3				
1N925	S			S	32	1.0	5.0m	1.0*	0.15				
1N926	S			S	32	1.0	5.0m	0.1*	0.15				
1N927	S			S	52	1.0	10m	0.1*	0.15				
1N928	S			S	96	1.0	10m	0.1*	0.15				
1N929	S			S	20	1.0	20m	0.1*					
1N930	S			S	50	1.0	20m	0.1*					
1N931	S			S	100	1.0	20m	0.1*					
1N932	S			S	200	1.0	20m	0.1*					
1N933	G			S	100	1.0	14m	10*	0.4				
1N934	S			S	60	1.0	30m	25n	1.0				
★1N935	S		1N935	R						9.0	0.01	7.5	0/75
★1N935A	S		1N935	R						9.0	0.01	7.5	-55/100
★1N935B	S		1N935	R						9.0	0.01	7.5	-55/150
★1N936	S		1N935	R						9.0	0.005	7.5	0/75
★1N936A	S		1N935	R						9.0	0.005	7.5	-55/100
★1N936B	S		1N935	R						9.0	0.005	7.5	-55/150
★1N937	S		1N935	R						9.0	0.002	7.5	0/75
★1N937A	S		1N935	R						9.0	0.002	7.5	-55/100
★1N937B	S		1N935	R						9.0	0.002	7.5	-55/150
★1N938	S		1N935	R						9.0	0.001	7.5	0/75
★1N938A	S		1N935	R						9.0	0.001	7.5	-55/100
★1N938B	S		1N935	R						9.0	0.001	7.5	-55/150
★1N939	S		1N935	R						9.0	0.0005	7.5	0/75
★1N939A	S		1N935	R						9.0	0.0005	7.5	-55/100
★1N939B	S		1N935	R						9.0	0.0005	7.5	-55/150
1N940	S			R						9.0	0.0002	7.5	0/75
1N940A	S			R						9.0	0.0002	7.5	-55/100
1N940B	S			R						9.0	0.0002	7.5	-55/150
★1N941	S		1N941	R						11.7	0.01	7.5	0/75
★1N941A	S		1N941	R						11.7	0.01	7.5	-55/100
★1N941B	S		1N941	R						11.7	0.01	7.5	-55/150
★1N942	S		1N941	R						11.7	0.005	7.5	0/75
★1N942A	S		1N941	R						11.7	0.005	7.5	-55/100
★1N942B	S		1N941	R						11.7	0.005	7.5	-55/150
★1N943	S		1N941	R						11.7	0.002	7.5	0/75
★1N943A	S		1N941	R						11.7	0.002	7.5	-55/100
★1N943B	S		1N941	R						11.7	0.002	7.5	-55/150
★1N944	S		1N941	R						11.7	0.001	7.5	0/75
★1N944A	S		1N941	R						11.7	0.001	7.5	-55/100
★1N944B	S		1N941	R						11.7	0.001	7.5	-55/150
★1N945	S		1N941	R						11.7	0.0005	7.5	0/75
★1N945A	S		1N941	R						11.7	0.0005	7.5	-55/100
★1N945B	S		1N941	R						11.7	0.0005	7.5	-55/150
1N946	S			R						11.7	0.0002	7.5	0/75
1N946A	S			R						11.7	0.0002	7.5	-55/100
1N946B	S			R						11.7	0.0002	7.5	-55/150
1N947	S			S		1.0	400m	2.0*					
1N948	S			S	36	1.5	100m	0.25*	1.0				
1N949	G			S	50	0.39	10m	10*					
1N950 thru	S		Table 3	V									

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	ZENER DIODES V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	REFERENCE DIODES V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N956			Table 3	V									
★1N957	S		1N957	Z						6.8	18.5	20	400m
★1N957A	S		1N957	Z						6.8	18.5	10	400m
★1N957B	S		1N957	Z						6.8	18.5	5.0	400m
★1N958	S		1N957	Z						7.5	16.5	20	400m
★1N958A	S		1N957	Z						7.5	16.5	10	400m
★1N958B	S		1N957	Z						7.5	16.5	5.0	400m
★1N959	S		1N957	Z						8.2	15	20	400m
★1N959A	S		1N957	Z						8.2	15	10	400m
★1N959B	S		1N957	Z						8.2	15	5.0	400m
★1N960	S		1N957	Z						9.1	14	20	400m
★1N960A	S		1N957	Z						9.1	14	10	400m
★1N960B	S		1N957	Z						9.1	14	5.0	400m
★1N961	S		1N957	Z						10	12.5	20	400m
★1N961A	S		1N957	Z						10	12.5	10	400m
★1N961B	S		1N957	Z						10	12.5	5.0	400m
★1N962	S		1N957	Z						11	11.5	20	400m
★1N962A	S		1N957	Z						11	11.5	10	400m
★1N962B	S		1N957	Z						11	11.5	5.0	400m
★1N963	S		1N957	Z						12	10.5	20	400m
★1N963A	S		1N957	Z						12	10.5	10	400m
★1N963B	S		1N957	Z						12	10.5	5.0	400m
★1N964	S		1N957	Z						13	9.5	20	400m
★1N964A	S		1N957	Z						13	9.5	10	400m
★1N964B	S		1N957	Z						13	9.5	5.0	400m
★1N965	S		1N957	Z						15	8.5	20	400m
★1N965A	S		1N957	Z						15	8.5	10	400m
★1N965B	S		1N957	Z						15	8.5	5.0	400m
★1N966	S		1N957	Z						16	7.8	20	400m
★1N966A	S		1N957	Z						16	7.8	10	400m
★1N966B	S		1N957	Z						16	7.8	5.0	400m
★1N967	S		1N957	Z						18	7.0	20	400m
★1N967A	S		1N957	Z						18	7.0	10	400m
★1N967B	S		1N957	Z						18	7.0	5.0	400m
★1N968	S		1N957	Z						20	6.2	20	400m
★1N968A	S		1N957	Z						20	6.2	10	400m
★1N968B	S		1N957	Z						20	6.2	5.0	400m
★1N969	S		1N957	Z						22	5.6	20	400m
★1N969A	S		1N957	Z						22	5.6	10	400m
★1N969B	S		1N957	Z						22	5.6	5.0	400m
★1N970	S		1N957	Z						24	5.2	20	400m
★1N970A	S		1N957	Z						24	5.2	10	400m
★1N970B	S		1N957	Z						24	5.2	5.0	400m
★1N971	S		1N957	Z						27	4.6	20	400m
★1N971A	S		1N957	Z						27	4.6	10	400m
★1N971B	S		1N957	Z						27	4.6	5.0	400m
★1N972	S		1N957	Z						30	4.2	20	400m
★1N972A	S		1N957	Z						30	4.2	10	400m
★1N972B	S		1N957	Z						30	4.2	5.0	400m
★1N973	S		1N957	Z						33	3.8	20	400m
★1N973A	S		1N957	Z						33	3.8	10	400m
★1N973B	S		1N957	Z						33	3.8	5.0	400m
★1N974	S		1N957	Z						36	3.4	20	400m
★1N974A	S		1N957	Z						36	3.4	10	400m
★1N974B	S		1N957	Z						36	3.4	5.0	400m
★1N975	S		1N957	Z						39	3.2	20	400m
★1N975A	S		1N957	Z						39	3.2	10	400m
★1N975B	S		1N957	Z						39	3.2	5.0	400m
★1N976	S		1N957	Z						43	3.0	20	400m
★1N976A	S		1N957	Z						43	3.0	10	400m
★1N976B	S		1N957	Z						43	3.0	5.0	400m
★1N977	S		1N957	Z						47	2.7	20	400m
★1N977A	S		1N957	Z						47	2.7	10	400m
★1N977B	S		1N957	Z						47	2.7	5.0	400m
★1N978	S		1N957	Z						51	2.5	20	400m
★1N978A	S		1N957	Z						51	2.5	10	400m
★1N978B	S		1N957	Z						51	2.5	5.0	400m
★1N979	S		1N957	Z						56	2.2	20	400m
★1N979A	S		1N957	Z						56	2.2	10	400m
★1N979B	S		1N957	Z						56	2.2	5.0	400m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N980	S		1N957	Z						62	2.0	20	400m
★1N980A	S		1N957	Z						62	2.0	10	400m
★1N980B	S		1N957	Z						62	2.0	5.0	400m
★1N981	S		1N957	Z						68	1.8	20	400m
★1N981A	S		1N957	Z						68	1.8	10	400m
★1N981B	S		1N957	Z						68	1.8	5.0	400m
★1N982	S		1N957	Z						75	1.7	20	400m
★1N982A	S		1N957	Z						75	1.7	10	400m
★1N982B	S		1N957	Z						75	1.7	5.0	400m
★1N983	S		1N957	Z						82	1.5	20	400m
★1N983A	S		1N957	Z						82	1.5	10	400m
★1N983B	S		1N957	Z						82	1.5	5.0	400m
★1N984	S		1N957	Z						91	1.4	20	400m
★1N984A	S		1N957	Z						91	1.4	10	400m
★1N984B	S		1N957	Z						91	1.4	5.0	400m
★1N985	S		1N957	Z						100	1.3	20	400m
★1N985A	S		1N957	Z						100	1.3	10	400m
★1N985B	S		1N957	Z						100	1.3	5.0	400m
★1N986	S		1N957	Z						110	1.1	20	400m
★1N986A	S		1N957	Z						110	1.1	10	400m
★1N986B	S		1N957	Z						110	1.1	5.0	400m
★1N987	S		1N957	Z						120	1.0	20	400m
★1N987A	S		1N957	Z						120	1.0	10	400m
★1N987B	S		1N957	Z						120	1.0	5.0	400m
★1N988	S		1N957	Z						130	0.95	20	400m
★1N988A	S		1N957	Z						130	0.95	10	400m
★1N988B	S		1N957	Z						130	0.95	5.0	400m
★1N989	S		1N957	Z						150	0.85	20	400m
★1N989A	S		1N957	Z						150	0.85	10	400m
★1N989B	S		1N957	Z						150	0.85	5.0	400m
★1N990	S		1N957	Z						160	0.80	20	400m
★1N990A	S		1N957	Z						160	0.80	10	400m
★1N990B	S		1N957	Z						160	0.80	5.0	400m
★1N991	S		1N957	Z						180	0.68	20	400m
★1N991A	S		1N957	Z						180	0.68	10	400m
★1N991B	S		1N957	Z						180	0.68	5.0	400m
★1N992	S		1N957	Z						200	0.65	20	400m
★1N992A	S		1N957	Z						200	0.65	10	400m
★1N992B	S		1N957	Z						200	0.65	5.0	400m
1N993	S			S	20	1.2	10m	1.0*	4.0				
1N994	G			S	6.5	1.0	10m	30*	2.0				
1N995	G			S	15	0.5	10m	10*	6.0				
1N996	G			S	20	0.8	40m	15*	0.3				
1N997	S			S	35	1.0	10m	25n	0.15				
1N998	S			S	150	1.0	200m	1.0n					
1N999	S			S	100	1.0	50m	1.0n	4.0				
1N1005	G			G	**380**	**0.15**	**0.25**						
1N1007	G			G	**380**	**0.3**	**0.35**						
1N1008	S			G	**380**	**0.3**	**0.4**						
1N1013	G			G	**380**	**0.15**	**0.25**						
1N1016	G			G	**380**	**0.15**	**0.4**						
1N1021	G			G	**380**	**0.15**	**0.25**						
1N1022	G			G	**380**	**0.15**	**0.3**						
1N1023	G			G	**380**	**0.15**	**0.35**						
1N1024	G			G	**380**	**0.15**	**0.4**						
1N1028	S	1N4001	1N4001	G	**50**	**1.5**	**0.25**		**15**				
1N1029	S	1N4002	1N4001	G	**100**	**1.5**	**0.25**		**15**				
1N1030	S	1N4003	1N4001	G	**150**	**1.5**	**0.25**		**15**				
1N1031	S	1N4003	1N4001	G	**200**	**1.5**	**0.25**		**15**				
1N1032	S	1N4004	1N4001	G	**300**	**1.5**	**0.25**		**15**				
1N1033	S	1N4004	1N4001	G	**400**	**1.5**	**0.25**		**15**				
1N1034	S			G	**50**	**1.5**	**0.5**		**15**				
1N1035	S			G	**100**	**1.5**	**0.5**		**15**				
1N1036	S			G	**150**	**1.5**	**0.5**		**15**				
1N1037	S			G	**200**	**1.5**	**0.5**		**15**				
1N1038	S			G	**300**	**1.5**	**0.5**		**15**				
1N1039	S			G	**400**	**1.5**	**0.5**		**15**				
1N1040	S			G	**50**	**1.5**	**0.5**		**15**				
1N1041	S			G	**100**	**1.5**	**0.5**		**15**				
1N1042	S			G	**150**	**1.5**	**0.5**		**15**				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1043	S			G	200	1.5	0.5		15				
1N1044	S			G	300	1.5	0.5		15				
1N1045	S			G	400	1.5	0.5		15				
1N1046	S			G	50	1.5	0.5		15				
1N1047	S			G	100	1.5	0.5		15				
1N1048	S			G	150	1.5	0.5		15				
1N1049	S			G	200	1.5	0.5		15				
1N1050	S			G	300	1.5	0.5		15				
1N1051	S			G	400	1.5	0.5		15				
1N1052	S	1N4001	1N4001	G	50	1.5	0.5		20				
1N1053	S	1N4002	1N4001	G	100	1.5	0.5		20				
1N1054	S	1N4003	1N4001	G	150	1.5	0.5		20				
1N1055	S	1N4003	1N4001	G	200	1.5	0.5		20				
1N1056	S	1N4004	1N4001	G	300	1.5	0.5		20				
1N1057	S	1N4004	1N4001	G	400	1.5	0.5		20				
1N1058	S			G	50	1.5	1.5		20				
1N1059	S			G	100	1.5	1.5		20				
1N1060	S			G	150	1.5	1.5		20				
1N1061	S			G	200	1.5	1.5		20				
1N1062	S			G	300	1.5	1.5		20				
1N1063	S			G	400	1.5	1.5		20				
1N1064	S			G	50	1.5	1.5		20				
1N1065	S			G	100	1.5	1.5		20				
1N1066	S			G	150	1.5	1.5		20				
1N1067	S			G	200	1.5	1.5		20				
1N1068	S			G	300	1.5	1.5		20				
1N1069	S			G	400	1.5	1.5		20				
1N1070	S			G	50	1.5	1.5		20				
1N1071	S			G	100	1.5	1.5		20				
1N1072	S			G	150	1.5	1.5		20				
1N1973	S			G	200	1.5	1.5		20				
1N1074	S			G	300	1.5	1.5		20				
1N1075	S			G	400	1.5	1.5		20				
1N1076	S			G	50	1.5	5.0		50				
1N1077	S			G	100	1.5	5.0		50				
1N1078	S			G	150	1.5	5.0		50				
1N1079	S			G	200	1.5	5.0		50				
1N1080	S			G	300	1.5	5.0		50				
1N1081	S	1N4002	1N4001	G	100	1.5	0.25		15				
1N1082	S	1N4003	1N4001	G	200	1.5	0.25		15				
1N1083	S	1N4004	1N4001	G	300	1.5	0.25		15				
1N1084	S	1N4004	1N4001	G	400	1.5	0.25		15				
1N1085	S			G	100	1.5	0.6		24				
1N1086	S			G	200	1.5	0.6		24				
1N1087	S			G	300	1.5	0.6		24				
1N1088	S			G	400	1.5	0.6		24				
1N1089	S			G	100	1.5	2.0		24				
1N1090	S			G	200	1.5	2.0		24				
1N1091	S			G	300	1.5	2.0		24				
1N1092	S			G	400	1.5	2.0		24				
1N1093	G			S	15	0.4	5.0m	25*	0.5				
1N1095	S	1N4005	1N4001	G	500	0.5	0.425	0.3	15				
1N1096	S	1N4005	1N4001	G	600	0.5	0.4	0.3	15				
1N1100	S	1N4002	1N4001	G	100	1.2	0.25	0.2	15				
1N1101	S	1N4003	1N4001	G	200	1.2	0.25	0.2	15				
1N1102	S	1N4004	1N4001	G	300	1.2	0.25	0.2	15				
1N1103	S	1N4004	1N4001	G	400	1.2	0.25	0.2	15				
1N1104	S	1N4005	1N4001	G	500	1.2	0.25	0.2	15				
1N1105	S	1N4005	1N4001	G	600	1.2	0.25	0.2	15				
1N1108	S			G	800	3.0	0.225		13.5				
1N1109	S			G	1200	4.5	0.212		12.7				
1N1110	S			G	1600	6.0	0.2		12				
1N1111	S			G	2000	7.5	0.187		11.2				
1N1112	S			G	2400	9.0	0.175		10.5				
1N1113	S			G	2800	10.5	0.162		9.7				
★1N1115	S	MR1121	MR1120	G	100	0.65	0.6	0.4	15				
★1N1116	S	MR1122	MR1120	G	200	0.65	0.6	0.3	15				
★1N1117	S	MR1123	MR1120	G	300	0.65	0.6	0.3	15				
★1N1118	S	MR1124	MR1120	G	400	0.65	0.6	0.3	15				
★1N1119	S	MR1125	MR1120	G	500	0.65	0.6	0.3	15				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N1120	S	MR1126	MR1120	G	600	0.65	0.6	0.3	15				
★1N1124	S			G	200	1.1	3.0	0.3	25				
★1N1124A	S	1N1124		G	200		3.3	0.3	25				
★1N1125	S			G	300	1.1	3.0	0.3	25				
★1N1125A	S	1N1125		G	300		3.3	0.3	25				
★1N1126	S			G	400	1.1	3.0	0.3	25				
★1N1126A	S	1N1126		G	400		3.3	0.3	25				
★1N1127	S			G	500	1.1	3.0	0.3	25				
★1N1127A	S	1N1126		G	500		3.3	0.3	25				
★1N1128	S			G	600	1.1	3.0	0.3	25				
★1N1128A	S	1N1126		G	600		3.3	0.3	25				
1N1130	S			G	1500	15	0.3	0.05					
1N1131	S			G	1500	15	0.3	0.05					
1N1132	S		Table 4	M									
1N1133	S			G	1500	15	0.085	0.025	3.5				
1N1134	S			G	1500	7.5	0.115	0.025	3.5				
1N1135	S			G	1800	18	0.075	0.025	3.5				
1N1136	S			G	1800	9.0	0.095	0.025	3.5				
1N1137	S			G	2400	24	0.057	0.025	3.5				
1N1138	S			G	2400	12	0.070	0.025	3.5				
1N1139	S			G	3600	27	0.075	0.025	3.5				
1N1140	S			G	3600	18	0.075	0.025	3.5				
1N1141	S			G	4800	36	0.070	0.025	3.5				
1N1142	S			G	4800	24	0.057	0.025	3.5				
1N1143	S			G	6000	45	0.057	0.025	3.5				
1N1143A	S			G	6000	30	0.075	0.025	3.5				
1N1144	S			G	7200	54	0.057	0.025	3.5				
1N1145	S			G	7200	36	0.070	0.025	3.5				
1N1146	S			G	8000	60	0.050	0.025	3.5				
1N1147	S			G	12k	60	0.050	0.025	3.5				
1N1148	S			G	14k	52	0.057	0.025	3.5				
1N1149	S			G	16k	60	0.050	0.025	3.5				
1N1150	S			G	1600		0.75		8.0				
1N1150A	S			G	1600	6.5	0.375	1.0	10				
1N1157	S			G	50		20		200				
1N1158	S			G	100		20						
1N1159	S			G	200		20						
1N1160	S			G	300		20						
1N1161	S			G	50		35		350				
1N1162	S			G	100		35		350				
1N1163	S			G	200		35		350				
1N1164	S			G	300		35		350				
1N1165	S			G	50		100		1000				
1N1166	S			G	100		100		1000				
1N1167	S			G	200		100		1000				
1N1168	S			G	300		100		1000				
1N1169	S	1N4004	1N4001	G			0.5						
1N1169A	S	1N4004	1N4001	G	400		0.5	3.5					
1N1170	G			S	50	1.0	4.0m	5.0*					
1N1171	S			G	50		20						
1N1172	S			G	100		20						
1N1173	S			G	200		20						
1N1174	S			G	300		20						
1N1175	S			G	50		35		350				
1N1176	S			G	100		35		350				
1N1177	S			G	200		35		350				
1N1178	S			G	300		35		350				
1N1179	S			G	50		100		1000				
1N1180	S			G	100		100		1000				
1N1181	S			G	200		100		1000				
1N1182	S			G	300		100		1000				
★1N1183	S		1N1183	G	50	1.7	35	10	500				
★1N1183A	S			G	50	1.1	40	5.0					
★1N1184	S		1N1183	G	100	1.7	35	10	500				
★1N1184A	S			G	100	1.1	40	5.0					
★1N1185	S		1N1183	G	150	1.7	35	10	500				
★1N1185A	S			G	150	1.1	40	5.0					
★1N1186	S		1N1183	G	200	1.7	35	10	500				
★1N1186A	S			G	200	1.1	40	5.0					
★1N1187	S		1N1183	G	300	1.7	35	10	500				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N1187A	S			G	300	1.1	40	5.0					
★1N1188	S		1N1183	G	400	1.7	35	10	500				
★1N1188A	S			G	400	1.1	40	5.0					
★1N1189	S		1N1183	G	500	1.7	35	10	500				
★1N1189A	S			G	500	1.2	40	2.0	800				
★1N1190	S		1N1183	G	600	1.7	35	10	500				
1N1190A	S			G	600	1.2	40	1.8	800				
★1N1191	S		1N248B	G	50	2.35	18	5.0	220				
1N1191A	S			G	50	2.0	22	2.5	500				
★1N1192	S		1N248B	G	100	2.35	18	5.0	220				
1N1192A	S			G	100	2.0	22	2.5	500				
★1N1193	S		1N248B	G	150	2.35	18	5.0	220				
1N1193A	S			G	150	2.0	22	2.5	500				
★1N1194	S		1N248B	G	200	2.35	18	5.0	220				
1N1194A	S			G	200	2.0	22	2.5	500				
★1N1195	S		1N248B	G	300	2.35	18	5.0	220				
★1N1195A	S		1N248B	G	300	0.6	20	3.2	350				
★1N1196	S		1N248B	G	400	2.35	18	5.0	220				
★1N1196A	S		1N248B	G	400	0.6	20	2.5	350				
★1N1197	S		1N248B	G	500	2.35	18	5.0	220				
★1N1197A	S		1N248B	G	500	0.6	20	2.2	350				
★1N1198	S		1N248B	G	600	2.35	18	5.0	220				
★1N1198A	S		1N248B	G	600	0.6	20	1.5	350				
★1N1199	S			G	50		12	10					
★1N1199A	S	1N1199		G	50	1.35	12	3.0	240				
1N1199B	S			G	50	1.2	12	0.9	250				
★1N1200	S			G	100		12	10					
★1N1200A	S	1N1200		G	100	1.35	50	2.5	240				
1N1200B	S			G	100	1.2	12	0.9	250				
★1N1201	S			G	150		12	10					
★1N1201A	S	1N1201		G	150	1.35	50	2.25	240				
1N1201B	S			G	150	1.2	12	0.9	250				
★1N1202	S			G	200		12	10					
★1N1202A	S	1N1202		G	200	1.35	50	2.0	240				
1N1202B	S			G	200	1.2	12	0.9	250				
★1N1203	S			G	300		12	10					
★1N1203A	S	1N1203		G	300	1.35	50	1.75	240				
1N1203B	S			G	300	1.2	12	0.9	250				
★1N1204	S			G	400		12	10					
★1N1204A	S	1N1204		G	400	1.35	50	1.5	240				
1N1204B	S			G	400	1.2	12	0.9	250				
★1N1205	S			G	500		12	10					
★1N1205A	S	1N1205		G	500	1.35	50	1.25	240				
1N1205B	S			G	500	1.2	12	0.9	250				
★1N1206	S			G	600		12	10					
★1N1206A	S	1N1206		G	600	1.35	50	1.0	240				
1N1206B	S			G	600	1.2	12	0.9	250				
1N1217	S	1N4001	1N4001	G	50	1.0	1.6	1.5	20				
1N1217A	S	1N4001	1N4001	G	50	1.5	1.6	0.05					
1N1217B	S			G	50	1.7	1.35	0.3	25				
1N1218	S	1N4002	1N4001	G	100	1.0	1.6	1.5	20				
1N1218A	S	1N4002	1N4001	G	100	1.5	1.6	0.05					
1N1218B	S			G	100	1.7	1.35	0.3	25				
1N1219	S	1N4003	1N4001	G	150	1.0	1.6	1.5	20				
1N1219A	S	1N4003	1N4001	G	150	1.5	1.6	0.05					
1N1219B	S			G	150	1.7	1.35	0.3	25				
1N1220	S	1N4003	1N4001	G	200	1.0	1.6	1.5	20				
1N1220A	S	1N4003	1N4001	G	200	1.5	1.6	0.05					
1N1220B	S			G	200	1.7	1.35	0.3	25				
1N1221	S	1N4004	1N4001	G	300	1.0	1.6	1.5	20				
1N1221A	S	1N4004	1N4001	G	300	1.5	1.6	0.05					
1N1221B	S			G	300	1.7	1.35	0.3	25				
1N1222	S	1N4004	1N4001	G	400	1.0	1.6	1.5	20				
1N1222A	S	1N4004	1N4001	G	400	1.5	1.6	0.05					
1N1222B	S			G	400	1.7	1.35	0.3	25				
1N1223	S	1N4005	1N4001	G	500	1.0	1.6	1.5	20				
1N1223A	S	1N4005	1N4001	G	500	1.5	1.6	0.05					
1N1223B	S			G	500	1.7	1.35	0.3	25				
1N1224	S	1N4005	1N4001	G	600	1.0	1.6	1.5	20				
1N1224A	S	1N4005	1N4001	G	600	1.5	1.6	0.05					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1224B	S			G	600	1.62	1.25	0.3	25				
1N1225	S	1N4006	1N4001	G	700	1.0	1.6	1.5	20				
1N1225A	S	1N4006	1N4001	G	700	1.55	1.1	0.5	25				
1N1225B	S			G	700	1.62	1.25	0.3	25				
1N1226	S	1N4006	1N4001	G	800	1.0	1.6	1.5	20				
1N1226A	S	1N4006	1N4001	G	800	1.50	1.1	0.5	25				
1N1226B	S			G	800	1.58	1.15	0.3	25				
1N1227	S			G	50	1.0	1.6	1.5	20				
1N1227A	S	MR1120	MR1120	G	50	1.5	1.6	0.05					
1N1228	S			G	100	1.0	1.6	1.5	20				
1N1228A	S	MR1121	MR1120	G	100	1.5	1.6	0.05					
1N1229	S			G	150	1.0	1.6	1.5	20				
1N1229A	S	MR1122	MR1120	G	150	1.5	1.6	0.05					
1N1230	S			G	200	1.0	1.6	1.5	20				
1N1230A	S	MR1122	MR1120	G	200	1.5	1.6	0.05					
1N1231	S			G	300	1.0	1.6	1.5	20				
1N1231A	S	MR1123	MR1120	G	300	1.5	1.6	0.05					
1N1232	S			G	400	1.0	1.6	1.5	20				
1N1232A	S	MR1124	MR1120	G	400	1.5	1.6	0.05					
1N1233	S			G	500	1.0	1.6	1.5	20				
1N1233A	S	MR1125	MR1120	G	500	1.5	1.6	0.05					
1N1234	S			G	600	1.0	1.6	1.5	20				
1N1234A	S	MR1126	MR1120	G	600	1.5	1.6	0.05					
1N1235	S			G	700	1.0	1.6	1.5	20				
1N1236	S			G	800	1.0	1.6	1.5	20				
1N1237	S			G	1600		0.75		8.0				
1N1238	S			G	1600		0.75		8.0				
1N1239	S			G	2800		0.5		5.0				
1N1240	S			G	50	1.0	0.25	0.5	5.0				
1N1241	S			G	100	1.0	0.25	0.5	5.0				
1N1242	S			G	200	1.0	0.25	0.5	5.0				
1N1243	S			G	300	1.0	0.2	0.5	5.0				
1N1244	S			G	400	1.0	0.15	0.5					
1N1244A	S			G	400	1.0	0.2	0.5	5.0				
1N1245	S			G	500	1.0	0.13	0.4					
1N1246	S			G	600	1.0	0.115	0.3					
1N1247	S			G	700	1.0	0.1	0.2					
1N1248	S			G	800	1.0	0.08	0.1					
1N1249	S			G	900	1.0	0.065	0.1					
1N1250	S			G	1000	1.0	0.05	0.1					
1N1251	S	1N4001	1N4001	G	50	1.0	0.5	0.5	5.0				
1N1252	S	1N4002	1N4001	G	100	1.0	0.5	0.5	5.0				
1N1253	S	1N4003	1N4001	G	200	1.0	0.5	0.5	5.0				
1N1254	S	1N4004	1N4001	G	300	1.0	0.5	0.5	5.0				
1N1255	S	1N4004	1N4001	G	400	1.0	0.5	0.5					
1N1255A	S	1N4004	1N4001	G	400	1.0	0.3	0.5	5.0				
1N1256	S	1N4005	1N4001	G	500	1.0	0.3	0.4					
1N1257	S	1N4005	1N4001	G	600	1.0	0.3	0.3					
1N1258	S	1N4006	1N4001	G	700	1.0	0.28	0.2					
1N1259	S	1N4006	1N4001	G	800	1.0	0.27	0.1					
1N1260	S	1N4007	1N4001	G	900	1.0	0.25	0.1					
1N1261	S	1N4007	1N4001	G	1000	1.0	0.24	0.1					
1N1262	S			G	4500		0.25		2.5				
1N1263	S			G	50		150		1500				
1N1263A	S			G	50		200		2000				
1N1264	S			G	100		150		1500				
1N1264A	S			G	100		200		2000				
1N1265	S			G	200		150		1500				
1N1265A	S			G	200		200		2000				
1N1266	S			G	300		150		1500				
1N1266A	S			G	300		200		2000				
1N1267	S			G	50		150		1500				
1N1267A	S			G	50		200		2000				
1N1268	S			G	100		150		1500				
1N1268A	S			G	100		200		2000				
1N1269	S			G	200		150		1500				
1N1269A	S			G	200		200		2000				
1N1270	S			G	300		150		1500				
1N1270A	S			G	300		200		2000				
1N1271	S			G	50		160	40					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1272	S			G	100		160	40					
1N1273	S			G	150		160	40					
1N1274	S			G	200		160	40					
1N1275	S			G	300		160	40					
1N1276	S			G	400		160	40					
1N1277	S			G	500		160	40					
1N1281	S			G	50		160	40					
1N1282	S			G	100		160	40					
1N1283	S			G	150		160	40					
1N1284	S			G	200		160	40					
1N1285	S			G	300		160	40					
1N1286	S			G	400		160	40					
1N1287	S			G	500		160	40					
1N1291	S			G	50		160	40					
1N1292	S			G	100		160	40					
1N1293	S			G	150		160	40					
1N1294	S			G	200		160	40					
1N1295	S			G	300		160	40					
1N1296	S			G	400		160	40					
1N1297	S			G	500		160	40					
1N1301	S	1N1183	1N1183	G	50	1.5	37	2.0	300				
1N1302	S	1N1184	1N1183	G	100	1.5	37	2.0	300				
1N1304	S	1N1186	1N1183	G	200	1.5	37	2.0	300				
1N1306	S	1N1187	1N1183	G	300	1.5	37	2.0	300				
★1N1313	S			Z						8.8	0.2	10	150m
★1N1313A	S			Z						8.8	0.2	5.0	150m
★1N1314	S			Z						10.5	0.2	10	150m
★1N1314A	S			Z						10.5	0.2	5.0	150m
★1N1315	S			Z						12.8	0.2	10	150m
★1N1315A	S			Z						12.8	0.2	5.0	150m
★1N1316	S			Z						15.8	0.2	10	150m
★1N1316A	S			Z						15.8	0.2	5.0	150m
★1N1317	S			Z						19	0.2	10	150m
★1N1317A	S			Z						19	0.2	5.0	150m
★1N1318	S			Z						23	0.2	10	150m
★1N1318A	S			Z						23	0.2	5.0	150m
★1N1319	S			Z						28	0.2	10	150m
★1N1319A	S			Z						28	0.2	5.0	150m
★1N1320	S			Z						34.5	0.2	10	150m
★1N1320A	S			Z						34.5	0.2	5.0	150m
★1N1321	S			Z						41	0.2	10	150m
★1N1321A	S			Z						41	0.2	5.0	150m
★1N1322	S			Z						48.5	0.2	10	150m
★1N1322A	S			Z						48.5	0.2	5.0	150m
★1N1323	S			Z						58	0.2	10	150m
★1N1323A	S			Z						58	0.2	5.0	150m
★1N1324	S			Z						71	0.2	10	150m
★1N1325	S			Z						89.5	0.2	10	150m
★1N1326	S			Z						105	0.2	10	150m
★1N1327	S			Z						127	0.2	10	150m
1N1329	S			G	1500	1.3	0.1	0.02	2.0				
1N1330	S			G	50		240	50					
1N1331	S			G	100		240	50					
1N1332	S			G	150		240	50					
1N1333	S			G	200		240	50					
1N1334	S			G	300		240	50					
1N1335	S			G	400		240	50					
1N1336	S			G	500		240	50					
1N1341	S			G	50	1.6	6.0	4.0	150				
1N1341A	S	MR1120	MR1120	G	50	1.4	6.0	3.0	150				
1N1341B	S			G	50	1.2	6.0	0.45	160				
1N1342	S			G	100	1.6	6.0	4.0	150				
1N1342A	S	MR1121	MR1120	G	100	1.4	6.0	2.5	150				
1N1342B	S			G	100	1.2	6.0	0.45	160				
1N1343	S			G	150	1.6	6.0	4.0	150				
1N1343A	S	MR1122	MR1120	G	150	1.4	6.0	2.25	150				
1N1343B	S			G	150	1.2	6.0	0.45	160				
1N1344	S			G	200	1.6	6.0	4.0	150				
1N1344A	S	MR1122	MR1120	G	200	1.4	6.0	2.0	150				
1N1344B	S			G	200	1.2	6.0	0.45	160				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1345	S			G	300	1.6	6.0	4.0	150				
1N1345A	S	MR1123	MR1120	G	300	1.4	6.0	1.75	150				
1N1345B	S			G	300	1.2	6.0	0.45	160				
1N1346	S			G	400	1.6	6.0	4.0	150				
1N1346A	S	MR1124	MR1120	G	400	1.4	6.0	1.5	150				
1N1346B	S			G	400	1.2	6.0	0.45	160				
1N1347	S			G	500	1.6	6.0	4.0	150				
1N1347A	S	MR1125	MR1120	G	500	1.4	6.0	1.25	150				
1N1347B	S			G	500	1.2	6.0	0.45	160				
1N1348	S			G	600	1.6	6.0	4.0	150				
1N1348A	S	MR1126	MR1120	G	600	1.4	6.0	1.0	150				
1N1348B	S			G	600	1.2	6.0	0.45	160				
★1N1351	S	1N2974A	1N2970	G						10	500	10	10W
★1N1351A	S	1N2974B	1N2970	G						10	500	5.0	10W
★1N1352	S	1N2975A	1N2970	G						11	500	10	10W
★1N1352A	S	1N2975B	1N2970	G						11	500	5.0	10W
★1N1353	S	1N2976A	1N2970	G						12	500	10	10W
★1N1353A	S	1N2976B	1N2970	G						12	500	5.0	10W
★1N1354	S	1N2977A	1N2970	G						13	500	10	10W
★1N1354A	S	1N2977B	1N2970	G						13	500	5.0	10W
★1N1355	S	1N2979A	1N2970	G						15	500	10	10W
★1N1355A	S	1N2979B	1N2970	G						15	500	5.0	10W
★1N1356	S	1N2980A	1N2970	Z						16	500	10	10W
★1N1356A	S	1N2980B	1N2970	Z						16	500	5.0	10W
★1N1357	S	1N2982A	1N2970	Z						18	150	10	10W
★1N1357A	S	1N2982B	1N2970	Z						18	150	5.0	10W
★1N1358	S	1N2984A	1N2970	Z						20	150	10	10W
★1N1358A	S	1N2984B	1N2970	Z						20	150	5.0	10W
★1N1359	S	1N2985A	1N2970	Z						22	150	10	10W
★1N1359A	S	1N2985B	1N2970	Z						22	150	5.0	10W
★1N1360	S	1N2986A	1N2970	Z						24	150	10	10W
★1N1360A	S	1N2986B	1N2970	Z						24	150	5.0	10W
★1N1361	S	1N2988A	1N2970	Z						27	150	10	10W
★1N1361A	S	1N2988B	1N2970	Z						27	150	5.0	10W
★1N1362	S	1N2989A	1N2970	Z						30	150	10	10W
★1N1362A	S	1N2989B	1N2970	Z						30	150	5.0	10W
★1N1363	S	1N2990A	1N2970	Z						33	150	10	10W
★1N1363A	S	1N2990B	1N2970	Z						33	150	5.0	10W
★1N1364	S	1N2991A	1N2970	Z						36	150	10	10W
★1N1364A	S	1N2991B	1N2970	Z						36	150	5.0	10W
★1N1365	S	1N2992A	1N2970	Z						39	150	10	10W
★1N1365A	S	1N2992B	1N2970	Z						39	150	5.0	10W
★1N1366	S	1N2993A	1N2970	Z						43	150	10	10W
★1N1366A	S	1N2993B	1N2970	Z						43	150	5.0	10W
★1N1367	S	1N2995A	1N2970	Z						47	150	10	10W
★1N1367A	S	1N2995B	1N2970	Z						47	150	5.0	10W
★1N1368	S	1N2997A	1N2970	Z						51	150	10	10W
★1N1368A	S	1N2997B	1N2970	Z						51	150	5.0	10W
★1N1369	S	1N2999A	1N2970	Z						56	150	10	10W
★1N1369A	S	1N2999B	1N2970	Z						56	150	5.0	10W
★1N1370	S	1N3000A	1N2970	Z						62	50	10	10W
★1N1370A	S	1N3000B	1N2970	Z						62	50	5.0	10W
★1N1371	S	1N3001A	1N2970	Z						68	50	10	10W
★1N1371A	S	1N3001B	1N2970	Z						68	50	5.0	10W
★1N1372	S	1N3002A	1N2970	Z						75	50	10	10W
★1N1372A	S	1N3002B	1N2970	Z						75	50	5.0	10W
★1N1373	S	1N3003A	1N2970	Z						82	50	10	10W
★1N1373A	S	1N3003B	1N2970	Z						82	50	5.0	10W
★1N1374	S	1N3004A	1N2970	Z						91	50	10	10W
★1N1374A	S	1N3004B	1N2970	Z						91	50	5.0	10W
★1N1375	S	1N3005A	1N2970	Z						100	50	10	10W
★1N1375A	S	1N3005B	1N2970	Z						100	50	5.0	10W
1N1376	S			G	50		240	50					
1N1377	S			G	100		240	50					
1N1378	S			G	150		240	50					
1N1379	S			G	200		240	50					
1N1380	S			G	300		240	50					
1N1381	S			G	400		240	50					
1N1382	S			G	500		240	50					
1N1396	S	MR1810SB	MR1210	G	50	1.55	70	15	1200				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_0 Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1397	S	MR1811SB	MR1210	G	100	1.55	70	15	1200				
1N1398	S	MR1812SB	MR1210	G	150	1.55	70	15	1200				
1N1399	S	MR1813SB	MR1210	G	200	1.55	70	15	1200				
1N1400	S	MR1815SB	MR1210	G	300	1.55	70	15	1200				
1N1401	S	MR1817SB	MR1210	G	400	1.55	70	15	1200				
1N1402	S	MR1818SB	MR1210	G	500	1.55	70	15	1200				
1N1403	S	MR1819SB	MR1210	G	600	1.55	70	15	1200				
1N1406	S	1N4005	1N4001	G	600	5.0	0.1	0.1	3.5				
1N1407	S	1N4006	1N4001	G	800	5.0	1.0	0.1	3.5				
1N1408	S	1N4007	1N4001	G	1000	5.0	1.0	0.1	3.5				
1N1409	S	MR991A	MR990A	G	1200	5.0	0.1	0.1	3.5				
1N1410	S	MR991A	MR990A	G	1500	6.25	0.1	0.1	3.5				
1N1411	S	MR992A	MR990A	G	1800	7.5	0.1	0.1	3.5				
1N1412	S	MR992A	MR990A	G	2000	6.25	0.1	0.1	3.5				
1N1413	S	MR993A	MR990A	G	2400	7.5	0.1	0.1	3.5				
1N1414	S			G	400	1.25	10	1.0	100				
1N1415	S			S		1.1	1.0	1.0*					
1N1416	S	1N2972B	1N2970	Z						8.2	200	5.0	10W
1N1417	S	1N2976B	1N2970	Z						12	200	5.0	10W
1N1418	S	1N2979B	1N2970	Z						15	100	5.0	10W
1N1419	S	1N2982B	1N2970	Z						18	100	5.0	10W
1N1420	S	1N2985B	1N2970	Z						22	100	5.0	10W
1N1421	S	1N2988B	1N2970	Z						27	50	5.0	10W
1N1422	S	1N3001B	1N2970	Z						68	20	5.0	10W
1N1423	S	1N3005B	1N2970	Z						100	20	5.0	10W
1N1424	S	1N3011B	1N2970	Z						150	10	5.0	10W
1N1425	S	1N4738A	1N2970	Z						8.2	20	5.0	1.0W
1N1426	S	1N4742A	1N2970	Z						12	20	5.0	1.0W
1N1427	S	1N4744A	1N2970	Z						15	10	5.0	1.0W
1N1428	S	1N4746A	1N2970	Z						18	10	5.0	1.0W
1N1429	S	1N4748A	1N2970	Z						22	10	5.0	1.0W
1N1430	S	1N4750A	1N2070	Z						27	5.0	5.0	1.0W
1N1431	S	1N4760A	1N2070	Z						68	2.0	5.0	1.0W
1N1432	S	1N4764A	1N2070	Z						100	2.0	5.0	1.0W
1N1433	S	1M150ZS5		Z						150	1.0	5.0	10W
1N1434	S	1N1183	1N1183	G	50	1.2	30	5.0					
1N1435	S	1N1184	1N1183	G	100	1.2	30	5.0					
1N1436	S	1N1186	1N1183	G	200	1.2	30	5.0					
1N1437	S	1N1188	1N1183	G	400	1.2	30	5.0					
1N1438	S	1N1190	1N1183	G	600	1.2	30	5.0					
1N1440	S	1N4003	1N4001	G	200	1.2	0.75	0.5	30				
1N1441	S	1N4004	1N4001	G	300	1.2	0.75	0.5	30				
1N1442	S	1N4004	1N4001	G	400	1.2	0.75	0.5	30				
1N1443	S	1N4007	1N4001	G	1000	1.0	1.6	1.5	20				
1N1443A	S			G	1000	1.45	1.1	0.5	25				
1N1443B	S			G	1000	1.55	1.1	0.3	25				
1N1444	S	MR1130	MR1120	G	1000	1.0	1.6	1.5	20				
1N1445	S			G	360	2.0	0.2	4.0					
1N1446	S			G	100	2.0		2.0					
1N1447	S			G	200	2.0		2.0					
1N1448	S			G	300	1.4		2.0					
1N1449	S			G	400	2.0		2.0					
1N1450	S			G	100	1.4		5.0					
1N1451	S			G	200	1.4		5.0					
1N1452	S			G	300	1.4		5.0					
1N1453	S			G	400	1.4		5.0					
1N1454	S			G	100	1.5	25	25					
1N1455	S			G	200	1.5	25	25					
1N1456	S			G	300	1.5	25	25					
1N1457	S			G	400	1.5	25	25					
1M1458	S			G	100	1.5	35	25					
1N1459	S			G	200	1.5	35	25					
1N1460	S			G	300	1.5	35	25					
1N1461	S			G	400	1.5	35	25					
1N1462	S			G	100	1.5	50	50					
1N1463	S			G	200	1.5	50	50					
1N1464	S			G	300	1.5	50	50					
1N1465	S			G	400	1.5	50	50					
1N1466	S	MR1221FB	MR1220	G	100	1.5	75	50					
1N1467	S	MR1223FB	MR1220	G	200	1.5	75	50					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1468	S	MR1225FB	MR1220	G	300	1.5	75	50					
1N1469	S	MR1227FB	MR1220	G	400	1.5	75	50					
1N1470	S			G	100	1.5	100	100					
1N1471	S			G	200	1.5	100	100					
1N1472	S			G	300	1.5	100	100					
1N1473	S			G	400	1.5	100	100					
1N1474	S			G	100	1.5	150	100					
1N1475	S			G	200	1.5	150	100					
1N1476	S			G	300	1.5	150	100					
1N1477	S			G	400	1.5	150	100					
1N1478	S	MR1241FB	MR1240	G	100	1.5	200	100					
1N1479	S	MR1243FB	MR1240	G	200	1.5	200	100					
1N1480	S	MR1245FB	MR1240	G	300	1.5	200	100					
1N1481	S	MR1247FB	MR1240	G	400	1.5	200	100					
1N1482	S	1N3995A	1N3993	Z						4.7	200	5.0	10W
1N1483	S	1N3998A	1N3993	Z						6.2	200	5.0	10W
1N1484	S	1N4732A	1N4728	Z						4.7	50	5.0	1.0W
1N1485	S	1N4735A	1N4728	Z						6.2	20	5.0	1.0W
1N1486	S	1N4005	1N4001	G	500		0.5	3.5					
1N1487	S	1N4002	1N4001	G	100	0.55	0.25	0.4	15				
1N1488	S	1N4003	1N4001	G	200	0.55	0.25	0.3	15				
1N1489	S	1N4004	1N4001	G	300	0.55	0.25	0.3	15				
1N1490	S	1N4004	1N4001	G	400	0.55	0.25	0.3	15				
1N1491	S	1N4005	1N4001	G	500	0.55		0.3	15				
1N1492	S	1N4005	1N4001	G	600	0.55		0.3	15				
★1N1507	S	1N4730	1N4728	Z						3.9	35	10	750m
★1N1507A	S	1N4730A	1N4728	Z						3.9	35	5.0	750m
★1N1508	S	1N4732	1N4728	Z						4.7	30	10	750m
★1N1508A	S	1N4732A	1N4728	Z						4.7	30	5.0	750m
★1N1509	S	1N4734	1N4728	Z						5.6	25	10	750m
★1N1509A	S	1N4734A	1N4728	Z						5.6	25	5.0	750m
★1N1510	S	1N4736	1N4728	Z						6.8	22	10	750m
★1N1510A	S	1N4736A	1N4728	Z						6.8	22	5.0	750m
★1N1511	S	1N4738	1N4728	Z						8.2	18	10	750m
★1N1511A	S	1N4738A	1N4728	Z						8.2	18	5.0	750m
★1N1512	S	1N4740	1N4728	Z						10	15	10	750m
★1N1512A	S	1N4740A	1N4728	Z						10	15	5.0	750m
★1N1513	S	1N4742	1N4728	Z						12	12	10	750m
★1N1513A	S	1N4742A	1N4728	Z						12	12	5.0	750m
★1N1514	S	1N4744	1N4728	Z						15	10	10	750m
★1N1514A	S	1N4744A	1N4728	Z						15	10	5.0	750m
★1N1515	S	1N4746	1N4728	Z						18	8.0	10	750m
★1N1515A	S	1N4746A	1N4728	Z						18	8.0	5.0	750m
★1N1516	S	1N4748	1N4728	Z						22	6.0	10	750m
★1N1516A	S	1N4748A	1N4728	Z						22	6.0	5.0	750m
★1N1517	S	1N4750	1N4728	Z						27	5.0	10	750m
★1N1517A	S	1N4750A	1N4728	Z						27	5.0	5.0	750m
★1N1518	S	1N4730	1N4728	Z						3.9	50	10	1.0W
★1N1518A	S	1N4730A	1N4728	Z						3.9	50	5.0	1.0W
★1N1519	S	1N4732	1N4728	Z						4.7	40	10	1.0W
★1N1519A	S	1N4732A	1N4728	Z						4.7	40	5.0	1.0W
★1N1520	S	1N4734	1N4728	Z						5.6	35	10	1.0W
★1N1520A	S	1N4734A	1N4728	Z						5.6	35	5.0	1.0W
★1N1521	S	1N4736	1N4728	Z						6.8	30	10	1.0W
★1N1521A	S	1N4736A	1N4728	Z						6.8	30	5.0	1.0W
★1N1522	S	1N4738	1N4728	Z						8.2	25	10	1.0W
★1N1522A	S	1N4738A	1N4728	Z						8.2	25	5.0	1.0W
★1N1523	S	1N4740	1N4728	Z						10	20	10	1.0W
★1N1523A	S	1N4740A	1N4728	Z						10	20	5.0	1.0W
★1N1524	S	1N4742	1N4728	Z						12	15	10	1.0W
★1N1524A	S	1N4742A	1N4728	Z						12	15	5.0	1.0W
★1N1525	S	1N4744	1N4728	Z						15	13	10	1.0W
★1N1525A	S	1N4744A	1N4728	Z						15	13	5.0	1.0W
★1N1526	S	1N4746	1N4728	Z						18	10	10	1.0W
★1N1526A	S	1N4746A	1N4728	Z						18	10	5.0	1.0W
★1N1527	S	1N4748	1N4728	Z						22	9.0	10	1.0W
★1N1527A	S	1N4748A	1N4728	Z						22	9.0	5.0	1.0W
★1N1528	S	1N4750	1N4728	Z						27	7.0	10	1.0W
★1N1528A	S	1N4750A	1N4728	Z						27	7.0	5.0	1.0W
★1N1530	S	1N3156	1N3154	R						8.4	0.002	10	-55/100

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N1530A	S	1N3157	1N3154	G						8.4	0.002	10	-55/100
1N1537	S	MR1120	MR1120	G	50	1.5	1.6	0.05					
1N1538	S	MR1121	MR1120	G	100	1.5	1.6	0.05					
1N1539	S	MR1122	MR1120	G	150	1.5	1.6	0.05					
1N1540	S	MR1122	MR1120	G	200	1.5	1.6	0.05					
1N1541	S	MR1123	MR1120	G	300	1.5	1.6	0.05					
1N1542	S	MR1124	MR1120	G	400	1.5	1.6	0.05					
1N1543	S	MR1125	MR1120	G	500	1.5	1.6	0.05					
1N1544	S	MR1126	MR1120	G	600	1.5	1.6	0.05					
1N1551	S	MR1121	MR1120	G	100	1.4		1.0					
1N1552	S	MR1122	MR1120	G	200	1.4		1.0					
1N1553	S	MR1123	MR1120	G	300	1.4		1.0					
1N1554	S	MR1124	MR1120	G	400	1.4		1.0					
1N1555	S	MR1125	MR1120	G	500	1.4		1.0					
1N1556	S	1N4002	1N4001	G	100	1.4	0.75	1.0					
1N1557	S	1N4003	1N4001	G	200	1.4	0.75	1.0					
1N1558	S	1N4004	1N4001	G	300	1.4	0.75	1.0					
1N1559	S	1N4004	1N4001	G	400	1.4	0.75	1.0					
1N1560	S	1N4005	1N4001	G	500	1.4	0.75	1.0					
1N1561	G			S	25	0.4	12m	25*					
1N1562	G			S	25	0.4	8.0m	25*					
1N1563	S			G	100	1.5	1.0	0.003	70				
1N1563A	S			G	100	1.5	1.5	0.003	70				
1N1564	S			G	200	1.5	1.0	0.003	70				
1N1564A	S			G	200	1.5	1.5	0.003	70				
1N1565	S			G	300	1.5	1.0	0.003	70				
1N1565A	S			G	300	1.5	1.5	0.003	70				
1N1566	S			G	400	1.5	1.0	0.003	70				
1N1566A	S			G	400	1.5	1.5	0.003	70				
1N1567	S			G	500	1.2	1.0	0.005	70				
1N1567A	S			G	500	1.5	1.5	0.003	70				
1N1568	S			G	600	1.2	1.0	0.005	70				
1N1568A	S			G	600	1.5	1.5	0.003	70				
1N1569	S			G	100	1.5	1.0	0.005	70				
1N1570	S			G	200	1.5	1.0	0.005	70				
1N1571	S			G	300	1.5	1.0	0.005	70				
1N1572	S			G	400	1.5	1.0	0.005	70				
1N1573	S			G	500	1.5	1.0	0.005	70				
1N1574	S			G	600	1.5	1.0	0.005	70				
1N1575	S			G	100	1.5	3.5	0.005	70				
1N1576	S			G	200	1.5	3.5	0.005	70				
1N1577	S			G	300	1.5	3.5	0.005	70				
1N1578	S			G	400	1.5	3.5	0.005	70				
1N1579	S			G	500	1.5	3.5	0.005	70				
1N1580	S			G	600	1.5	3.5	0.005	70				
1N1581	S	MR1120	MR1120	G	50	1.5	3.0	5.0	40				
1N1582	S	MR1121	MR1120	G	100	1.5	3.0	5.0	40				
1N1583	S	MR1122	MR1120	G	200	1.5	3.0	5.0	40				
1N1584	S	MR1123	MR1120	G	300	1.5	3.0	5.0	40				
1N1585	S	MR1124	MR1120	G	400	1.5	3.0	5.0	40				
1N1586	S	MR1125	MR1120	G	500	1.5	3.0	5.0	40				
1N1587	S	MR1126	MR1120	G	600	1.5	3.0	5.0	40				
★1N1588	S	1N3993	1N3993	Z						3.9	150	10	3.5W
★1N1588A	S	1N3993A	1N3993	Z						3.9	150	5.0	3.5W
★1N1589	S	1N3995	1N3993	Z						4.7	125	10	3.5W
★1N1589A	S	1N3995A	1N3993	Z						4.7	125	5.0	3.5W
★1N1590	S	1N3997	1N3993	Z						5.6	110	10	3.5W
★1N1590A	S	1N3997A	1N3993	Z						5.6	110	5.0	3.5W
★1N1591	S	1N2970RA	1N2970	Z						6.8	100	10	3.5W
★1N1591A	S	1N2970RB	1N2970	Z						6.8	100	5.0	3.5W
★1N1592	S	1N2972RA	1N2970	Z						8.2	80	10	3.5W
★1N1592A	S	1N2972RB	1N2970	Z						8.2	80	5.0	3.5W
★1N1593	S	1N2974RA	1N2970	Z						10	70	10	3.5W
★1N1593A	S	1N2974RB	1N2970	Z						10	70	5.0	3.5W
★1N1594	S	1N2976RA	1N2970	Z						12	50	10	3.5W
★1N1594A	S	1N2976RB	1N2970	Z						12	50	5.0	3.5W
★1N1595	S	1N2979RA	1N2970	Z						15	40	10	3.5W
★1N1595A	S	1N2979RB	1N2970	Z						15	40	5.0	3.5W
★1N1596	S	1N2982RA	1N2970	Z						18	35	10	3.5W
★1N1596A	S	1N2982RB	1N2970	Z						18	35	5.0	3.5W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N1597	S	1N2985RA	1N2970	Z						22	30	10	3.5W
★1N1597A	S	1N2985RB	1N2970	Z						22	30	5.0	3.5W
★1N1598	S	1N2988RA	1N2970	Z						27	25	10	3.5W
★1N1598A	S	1N2988RB	1N2970	Z						27	25	5.0	3.5W
★1N1599	S	1N3993	1N3993	Z						3.9	500	10	10W
★1N1599A	S	1N3993A	1N3993	Z						3.9	500	5.0	10W
★1N1600	S	1N3995	1N3993	Z						4.7	400	10	10W
★1N1600A	S	1N3995A	1N3993	Z						4.7	400	5.0	10W
★1N1601	S	1N3997	1N3993	Z						5.6	350	10	10W
★1N1601A	S	1N3997A	1N3993	Z						5.6	350	5.0	10W
★1N1602	S	1N2970RA	1N2970	Z						6.8	300	10	10W
★1N1602A	S	1N2970RB	1N2970	Z						6.8	300	5.0	10W
★1N1603	S	1N2972RA	1N2970	Z						8.2	250	10	10W
★1N1603A	S	1N2972RB	1N2970	Z						8.2	250	5.0	10W
★1N1604	S	1N2974RA	1N2970	Z						10	200	10	10W
★1N1604A	S	1N2974RB	1N2970	Z						10	200	5.0	10W
★1N1605	S	1N2976RA	1N2970	Z						12	170	10	10W
★1N1605A	S	1N2976RB	1N2970	Z						12	170	5.0	10W
★1N1606	S	1N2979RA	1N2970	Z						15	140	10	10W
★1N1606A	S	1N2979RB	1N2970	Z						15	140	5.0	10W
★1N1607	S	1N2982RA	1N2970	Z						18	110	10	10W
★1N1607A	S	1N2982RB	1N2970	Z						18	110	5.0	10W
★1N1608	S	1N2985RA	1N2970	Z						22	90	10	10W
★1N1608A	S	1N2985RB	1N2970	Z						22	90	5.0	10W
★1N1609	S	1N2988RA	1N2970	Z						27	70	10	10W
★1N1609A	S	1N2988RB	1N2970	Z						27	70	5.0	10W
1N1610	S		Table 4	M									
1N1611	S		Table 4	M									
1N1611A	S		Table 4	M									
1N1611B	S		Table 4	M									
1N1612	S	MR1120	MR1120	G	50	1.5	5.0	1.0					
1N1613	S	MR1121	MR1120	G	100	1.5	5.0	1.0					
1N1614	S	MR1122	MR1120	G	200	1.5	5.0	1.0					
1N1615	S	MR1124	MR1120	G	400	1.5	5.0	1.0					
1N1616	S	MR1126	MR1120	G	600	1.5	5.0	1.0					
1N1617	S	1N4002	1N4001	G	100	1.2	1.5		60				
1N1618	S	1N4003	1N4001	G	200	1.2	1.5		60				
1N1619	S	1N4004	1N4001	G	300	1.2	1.5		60				
1N1620	S	1N4004	1N4001	G	400	1.2	1.5		60				
1N1621	S	MR1121	MR1120	G	100	1.2	10		80				
1N1622	S	MR1122	MR1120	G	200	1.2	10		80				
1N1623	S	MR1123	MR1120	G	300	1.2	10		80				
1N1624	S	MR1124	MR1120	G	400	1.2	10		80				
1N1625	E			G	48	1.0		0.015	0.005				
1N1625A	E			G	48	1.0		0.015	0.01				
1N1626	E			G	96	2.0		0.015	0.005				
1N1626A	E			G	96	2.0		0.015	0.01				
1N1627	E			G	48	1.0	0.003	0.027	0.08				
1N1628	E			G	96	2.0	0.003	0.027	0.08				
1N1629	E			G	144	3.0	0.003	0.027	0.08				
1N1630	E			G	192	4.0	0.003	0.027	0.08				
1N1631	E			G	240	5.0	0.003	0.027	0.08				
1N1632	E			G	288	6.0	0.003	0.027	0.08				
1N1633	E			G	336	7.0	0.003	0.027	0.08				
1N1634	E			G	384	8.0	0.003	0.027	0.08				
1N1635	E			G	48	1.0	0.013	0.108	0.25				
1N1636	E			G	96	2.0	0.013	0.108	0.25				
1N1637	E			G	144	3.0	0.013	0.108	0.25				
1N1638	E			G	192	4.0	0.013	0.108	0.25				
1N1639	E			G	240	5.0	0.013	0.108	0.25				
1N1640	E			G	48	1.0	0.028	0.240	0.55				
1N1641	E			G	96	2.0	0.028	0.240	0.55				
1N1642	E			G	144	3.0	0.028	0.240	0.55				
1N1644	S	1N4001	1N4001	G	50	0.5	0.75	0.4	15				
1N1645	S	1N4002	1N4001	G	100	0.5	0.75	0.4	15				
1N1646	S	1N4003	1N4001	G	150	0.5	0.75	0.3	15				
1N1647	S	1N4003	1N4001	G	200	0.5	0.75	0.3	15				
1N1648	S	1N4004	1N4001	G	250	0.5	0.75	0.3	15				
1N1649	S	1N4004	1N4001	G	300	0.5	0.75	0.3	15				
1N1650	S	1N4004	1N4001	G	350	0.5	0.75	0.3	15				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1651	S	1N4004	1N4001	G	400	0.5	0.25	0.3	15				
1N1652	S	1N4005	1N4001	G	500	0.5	0.25	0.3	15				
1N1653	S	1N4005	1N4001	G	600	0.5	0.25	0.3	15				
1N1660	S	MR1220SB	MR1220SB	G	50		160	40					
1N1661	S	MR1221SB	MR1220	G	100		160	40					
1N1662	S	MR1222SB	MR1220	G	150		160	40					
1N1663	S	MR1223SB	MR1220	G	200		160	40					
1N1664	S	MR1225SB	MR1220	G	300		160	40					
1N1665	S	MR1227SB	MR1220	G	400		160	40					
1N1666	S	MR1228SB	MR1220	G	500		160	40					
1N1670	S			G	50		240	50					
1N1671	S			G	100		240	50					
1N1672	S			G	150		240	50					
1N1673	S			G	200		240	50					
1N1674	S			G	300		240	50					
1N1675	S			G	400		240	50					
1N1676	S			G	500		240	50					
1N1680	S			G	150	1.1	50	25	700				
1N1681	S			G	250	1.1	50	25	700				
1N1682	S			G	300	1.1	50	25	700				
1N1683	S			G	350	1.1	50	25	700				
1N1684	S			G	400	1.1	50	25	700				
1N1685	S			G	450	1.1	50	25	700				
1N1686	S			G	500	1.1	50	25	700				
1N1687	S			G	600	1.1	50	25	700				
1N1688	S			G	700	1.1	50	25	700				
1N1689	S			G	800	1.1	50	25	700				
1N1690	S			G	900	1.1	50	25	700				
1N1691	S			G	1000	1.1	50	25	700				
1N1692	S	1N4002	1N4001	G	100	0.6	0.25	0.5	20				
1N1693	S	1N4003	1N4001	G	200	0.6	0.25	0.5	20				
1N1694	S	1N4004	1N4001	G	300	0.6	0.25	0.5	20				
1N1695	S	1N4004	1N4001	G	400	0.6	0.25	0.5	20				
1N1696	S	1N4005	1N4001	G	500	0.6		0.5	20				
1N1697	S	1N4005	1N4001	G	600	0.6		0.5	20				
1N1698	S			G	6600	33	0.062						
1N1699	S			G	10k	37	0.058						
1N1700	S			G	12k	45	0.05						
1N1701	S	1N4001	1N4001	G	50	1.3	0.3	0.2	8.0				
1N1702	S	1N4002	1N4001	G	100	1.3	0.3	0.2	8.0				
1N1703	S	1N4003	1N4001	G	200	1.3	0.3	0.2	8.0				
1N1704	S	1N4004	1N4001	G	300	1.3	0.3	0.2	8.0				
1N1705	S	1N4004	1N4001	G	400	1.3	0.3	0.2	8.0				
1N1706	S	1N4005	1N4001	G	500	1.3	0.3	0.2	8.0				
1N1707	S	1N4001	1N4001	G	50	1.15	0.5	0.2	10				
1N1708	S	1N4002	1N4001	G	100	1.15	0.5	0.2	10				
1N1709	S	1N4003	1N4001	G	200	1.15	0.5	0.2	10				
1N1710	S	1N4004	1N4001	G	300	1.15	0.5	0.2	10				
1N1711	S	1N4004	1N4001	G	400	1.15	0.5	0.2	10				
1N1712	S	1N4005	1N4001	G	500	1.15	0.5	0.2	10				
1N1730	S	1N4007	1N4001	G	1000	5.0		0.1	2.5				
1N1730A	S			G	1000		0.35		6.0				
1N1731	S	MR991A	MR990A	G	1500	5.0		0.1	2.5				
1N1731A	S			G	1500		0.35		6.0				
1N1732	S	MR992A	MR990A	G	2000	9.0		0.1	2.5				
1N1732A	S			G	2000		0.35		6.0				
1N1733	S	MR994A	MR990A	G	3000	12		0.1	2.5				
1N1733A	S			G	3000		0.35		6.0				
1N1734	S	MR996A	MR990A	G	5000	18		0.1	2.5				
1N1734A	S			G	5000		0.35		6.0				
★1N1735	S	1N821	1N821	R						6.2	0.8	7.5	-55/150
★1N1736	S	1N941A	1N941	R						12.4	0.8	7.5	-55/150
★1N1736A	S	1N942A	1N941	R						12.4	0.4	7.5	-55/150
★1N1737	S	1N4060	1N429	R						18.6	0.8	7.5	-55/150
★1N1737A	S	1N4060A	1N429	R						18.6	0.4	7.5	-55/150
★1N1738	S	1N4062	1N429	R						24.8	0.8	7.5	-55/150
★1N1738A	S	1N4062A	1N429	R						24.8	0.4	7.5	-55/150
★1N1739	S	1N4064	1N429	R						31	0.8	7.5	-55/150
★1N1739A	S	1N4064A	1N429	R						31	0.4	7.5	-55/150
★1N1740	S	1N4066	1N429	R						37.2	0.8	7.5	-55/150

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N1740A	S	1N4066A	1N429	R						37.2	0.4	7.5	-55/150
★1N1741	S	1N4067	1N429	R						43.4	0.8	7.5	-55/150
★1N1741A	S	1N4067A	1N429	R						43.4	0.4	7.5	-55/150
★1N1742	S	1N4069	1N429	R						49.6	0.8	7.5	-55/150
★1N1742A	S	1N4069A	1N429	R						49.6	0.4	7.5	-55/150
1N1743	S	1N2974A	1N2970	Z						10	250	10	10W
1N1744	S	1N4740	1N4728	Z						10	25	10	1.0W
1N1745	S			G	1500	15	0.32	0.2	3.5				
1N1746	S			G	1500	7.5	0.5	0.2	3.5				
1N1747	S			G	1800	18	0.31	0.2	3.5				
1N1748	S			G	1800	9.0	0.38	0.2	3.5				
1N1749	S			G	2400	24	0.37	0.2	3.5				
1N1750	S			G	2400	12	0.32	0.2	3.5				
1N1751	S			G	3600	27	0.42	0.2	3.5				
1N1752	S			G	3600	18	0.41	0.2	3.5				
1N1753	S			G	4800	36	0.38	0.2	3.5				
1N1754	S			G	4800	24	0.37	0.2	3.5				
1N1755	S			G	6000	45	0.33	0.2	3.5				
1N1756	S			G	6000	30	0.41	0.2	3.5				
1N1757	S			G	7200	54	0.33	0.2	3.5				
1N1758	S			G	7200	36	0.38	0.2	3.5				
1N1759	S			G	8000	60	0.29	0.2	3.5				
1N1760	S			G	12k	60	0.29	0.2	3.5				
1N1761	S			G	14k	52	0.34	0.2	3.5				
1N1762	S			G	16k	60	0.29	0.2	3.5				
1N1763	S	1N4004	1N4001	G	400	3.0	0.5	0.1	35				
1N1763A	S			G	400	1.2	1.0	0.5	25				
1N1764	S	1N4005	1N4001	G	500	3.0	0.5	0.1	35				
1N1764A	S			G	500	1.2	1.0	0.5	25				
★1N1765	S	1N4734	1N4728	Z						5.6	100	10	1.0W
★1N1765A	S	1N4734A	1N4728	Z						5.6	100	5.0	1.0W
★1N1766	S	1N4735	1N4728	Z						6.2	100	10	1.0W
★1N1766A	S	1N4735A	1N4728	Z						6.2	100	5.0	1.0W
★1N1767	S	1N4736	1N4728	Z						6.8	100	10	1.0W
★1N1767A	S	1N4736A	1N4728	Z						6.8	100	5.0	1.0W
★1N1768	S	1N4737	1N4728	Z						7.5	100	10	1.0W
★1N1768A	S	1N4737A	1N4728	Z						7.5	100	5.0	1.0W
★1N1769	S	1N4738	1N4728	Z						8.2	100	10	1.0W
★1N1769A	S	1N4738A	1N4728	Z						8.2	100	5.0	1.0W
★1N1770	S	1N4739	1N4728	Z						9.1	50	10	1.0W
★1N1770A	S	1N4739A	1N4728	Z						9.1	50	5.0	1.0W
★1N1771	S	1N4740	1N4728	Z						10	50	10	1.0W
★1N1771A	S	1N4740A	1N4728	Z						10	50	5.0	1.0W
★1N1772	S	1N4741	1N4728	Z						11	50	10	1.0W
★1N1772A	S	1N4741A	1N4728	Z						11	50	5.0	1.0W
★1N1773	S	1N4742	1N4728	Z						12	50	10	1.0W
★1N1773A	S	1N4742A	1N4728	Z						12	50	5.0	1.0W
★1N1774	S	1N4743	1N4728	Z						13	50	10	1.0W
★1N1774A	S	1N4743A	1N4728	Z						13	50	5.0	1.0W
★1N1775	S	1N4744	1N4728	Z						15	50	10	1.0W
★1N1775A	S	1N4744A	1N4728	Z						15	50	5.0	1.0W
★1N1776	S	1N4745	1N4728	Z						16	50	10	1.0W
★1N1776A	S	1N4745A	1N4728	Z						16	50	5.0	1.0W
★1N1777	S	1N4746	1N4728	Z						18	50	10	1.0W
★1N1777A	S	1N4746A	1N4728	Z						18	50	5.0	1.0W
★1N1778	S	1N4747	1N4728	Z						20	15	10	1.0W
★1N1778A	S	1N4747A	1N4728	Z						20	15	5.0	1.0W
★1N1779	S	1N4748	1N4728	Z						22	15	10	1.0W
★1N1779A	S	1N4748A	1N4728	Z						22	15	5.0	1.0W
★1N1780	S	1N4749	1N4728	Z						24	15	10	1.0W
★1N1780A	S	1N4749A	1N4728	Z						24	15	5.0	1.0W
★1N1781	S	1N4750	1N4728	Z						27	15	10	1.0W
★1N1781A	S	1N4750A	1N4728	Z						27	15	5.0	1.0W
★1N1782	S	1N4751	1N4728	Z						30	15	10	1.0W
★1N1782A	S	1N4751A	1N4728	Z						30	15	5.0	1.0W
★1N1783	S	1N4752	1N4728	Z						33	15	10	1.0W
★1N1783A	S	1N4752A	1N4728	Z						33	15	5.0	1.0W
★1N1784	S	1N4753	1N4728	Z						36	15	10	1.0W
★1N1784A	S	1N4753A	1N4728	Z						36	15	5.0	1.0W
★1N1785	S	1N4754	1N4728	Z						39	15	10	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N1785A	S	1N4754A	1N4728	Z						39	15	5.0	1.0W
★1N1786	S	1N4755	1N4728	Z						43	15	10	1.0W
★1N1786A	S	1N4755A	1N4728	Z						43	15	5.0	1.0W
★1N1787	S	1N4756	1N4728	Z						47	15	10	1.0W
★1N1787A	S	1N4756A	1N4728	Z						47	15	5.0	1.0W
★1N1788	S	1N4757	1N4728	Z						51	15	10	1.0W
★1N1788A	S	1N4757A	1N4728	Z						51	15	5.0	1.0W
★1N1789	S	1N4758	1N4728	Z						56	15	10	1.0W
★1N1789A	S	1N4758A	1N4728	Z						56	15	5.0	1.0W
★1N1790	S	1N4759	1N4728	Z						62	5.0	10	1.0W
★1N1790A	S	1N4759A	1N4728	Z						62	5.0	5.0	1.0W
★1N1791	S	1N4760	1N4728	Z						68	5.0	10	1.0W
★1N1791A	S	1N4760A	1N4728	Z						68	5.0	5.0	1.0W
★1N1792	S	1N4761	1N4728	Z						75	5.0	10	1.0W
★1N1792A	S	1N4761A	1N4728	Z						75	5.0	5.0	1.0W
★1N1793	S	1N4762	1N4728	Z						82	5.0	10	1.0W
★1N1793A	S	1N4762A	1N4728	Z						82	5.0	5.0	1.0W
★1N1794	S	1N4763	1N4728	Z						91	5.0	10	1.0W
★1N1794A	S	1N4763A	1N4728	Z						91	5.0	5.0	1.0W
★1N1795	S	1N4764	1N4728	Z						100	5.0	10	1.0W
★1N1795A	S	1N4764A	1N4728	Z						100	5.0	5.0	1.0W
★1N1796	S	1M110ZS1C	1N4728	Z						110	5.0	10	1.0W
★1N1796A	S	1M110ZS5	1N4728	Z						110	5.0	5.0	1.0W
★1N1797	S	1M120ZS10	1N4728	Z						120	5.0	10	1.0W
★1N1797A	S	1M120ZS5	1N4728	Z						120	5.0	5.0	1.0W
★1N1798	S	1M130ZS10	1N4728	Z						130	5.0	10	1.0W
★1N1798A	S	1M130ZS5	1N4728	Z						130	5.0	5.0	1.0W
★1N1799	S	1M150ZS10	1N4728	Z						150	5.0	10	1.0W
★1N1799A	S	1M150ZS5	1N4728	Z						150	5.0	5.0	1.0W
★1N1800	S	1M160ZS10	1N4728	Z						160	5.0	10	1.0W
★1N1800A	S	1M160ZS5	1N4728	Z						160	5.0	5.0	1.0W
★1N1801	S	1M180ZS10	1N4728	Z						180	5.0	10	1.0W
★1N1801A	S	1M180ZS5	1N4728	Z						180	5.0	5.0	1.0W
★1N1802	S	1M200ZS10	1N4728	Z						200	5.0	10	1.0W
★1N1802A	S	1M200ZS5	1N4728	Z						200	5.0	5.0	1.0W
★1N1803	S	1N3997R	1N3993	Z						5.6	5.0	10	10W
★1N1803A	S	1N3997RA	1N3993	Z						5.6	1000	5.0	10W
★1N1804	S	1N3998R	1N3993	Z						6.2	1000	10	10W
★1N1804A	S	1N3998RA	1N3993	Z						6.2	1000	5.0	10W
★1N1805	S	1N2970A	1N2970	Z						6.8	1000	10	10W
★1N1805A	S	1N2970B	1N2970	Z						6.8	1000	5.0	10W
★1N1806	S	1N2971A	1N2970	Z						7.5	1000	10	10W
★1N1806A	S	1N2971B	1N2970	Z						7.5	1000	5.0	10W
★1N1807	S	1N2972A	1N2970	Z						8.2	1000	10	10W
★1N1807A	S	1N2972B	1N2970	Z						8.2	1000	5.0	10W
★1N1808	S	1N2973A	1N2970	Z						9.1	1000	10	10W
★1N1808A	S	1N2973B	1N2970	Z						9.1	500	5.0	10W
★1N1809	S	1N3007A	1N2970	Z						110	50	10	10W
★1N1809A	S	1N3007B	1N2970	Z						110	50	5.0	10W
★1N1810	S	1N3008A	1N2970	Z						120	50	10	10W
★1N1810A	S	1N3008B	1N2970	Z						120	50	5.0	10W
★1N1811	S	1N3009A	1N2970	Z						130	50	10	10W
★1N1811A	S	1N3009B	1N2970	Z						130	50	5.0	10W
★1N1812	S	1N3011A	1N2970	Z						150	50	10	10W
★1N1812A	S	1N3011B	1N2970	Z						150	50	5.0	10W
★1N1813	S	1N3012A	1N2970	Z						160	50	10	10W
★1N1813A	S	1N3012B	1N2970	Z						160	50	5.0	10W
★1N1814	S	1N3014A	1N2970	Z						180	50	10	10W
★1N1814A	S	1N3014B	1N2970	Z						180	50	5.0	10W
★1N1815	S	1N3015A	1N2970	Z						200	50	10	10W
★1N1815A	S	1N3015B	1N2970	Z						200	50	5.0	10W
★1N1816	S	1N2977A	1N2970	Z						13	500	10	10W
★1N1816A	S	1N2977B	1N2970	Z						13	500	5.0	10W
★1N1817	S	1N2979A	1N2970	Z						15	500	10	10W
★1N1817A	S	1N2979B	1N2970	Z						15	500	5.0	10W
★1N1818	S	1N2980A	1N2970	Z						16	500	10	10W
★1N1818A	S	1N2980B	1N2970	Z						16	500	5.0	10W
★1N1819	S	1N2982A	1N2970	Z						18	500	10	10W
★1N1819A	S	1N2982B	1N2970	Z						18	500	5.0	10W
★1N1820	S	1N2984A	1N2970	Z						20	250	10	10W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N1820A	S	1N2984B	1N2970	Z						20	250	5.0	10W
★1N1821	S	1N2985A	1N2970	Z						22	250	10	10W
★1N1821A	S	1N2985B	1N2970	Z						22	250	5.0	10W
★1N1822	S	1N2986A	1N2970	Z						24	250	10	10W
★1N1822A	S	1N2986B	1N2970	Z						24	250	5.0	10W
★1N1823	S	1N2988A	1N2970	Z						27	250	10	10W
★1N1823A	S	1N2988B	1N2970	Z						27	250	5.0	10W
★1N1824	S	1N2989A	1N2970	Z						30	250	10	10W
★1N1824A	S	1N2989B	1N2970	Z						30	250	5.0	10W
★1N1825	S	1N2990A	1N2970	Z						33	150	10	10W
★1N1825A	S	1N2990B	1N2970	Z						33	150	5.0	10W
★1N1826	S	1N2991A	1N2970	Z						36	150	10	10W
★1N1826A	S	1N2991B	1N2970	Z						36	150	5.0	10W
★1N1827	S	1N2992A	1N2970	Z						39	150	10	10W
★1N1827A	S	1N2992B	1N2970	Z						39	150	5.0	10W
★1N1828	S	1N2993A	1N2970	Z						43	150	10	10W
★1N1828A	S	1N2993B	1N2970	Z						43	150	5.0	10W
★1N1829	S	1N2995A	1N2970	Z						47	150	10	10W
★1N1829A	S	1N2995B	1N2970	Z						47	150	5.0	10W
★1N1830	S	1N2997A	1N2970	Z						51	150	10	10W
★1N1830A	S	1N2997B	1N2970	Z						51	150	5.0	10W
★1N1831	S	1N2999A	1N2970	Z						56	150	10	10W
★1N1831A	S	1N2999B	1N2970	Z						56	150	5.0	10W
★1N1832	S	1N3000A	1N2970	Z						62	50	10	10W
★1N1832A	S	1N3000B	1N2970	Z						62	50	5.0	10W
★1N1833	S	1N3001A	1N2970	Z						68	50	10	10W
★1N1833A	S	1N3001B	1N2970	Z						68	50	5.0	10W
★1N1834	S	1N3002A	1N2970	Z						75	50	10	10W
★1N1834A	S	1N3002B	1N2970	Z						75	50	5.0	10W
★1N1835	S	1N3003A	1N2970	Z						82	50	10	10W
★1N1835A	S	1N3003B	1N2970	Z						82	50	5.0	10W
★1N1836	S	1N3004A	1N2970	Z						91	50	10	10W
★1N1836A	S	1N3004B	1N2970	Z						91	50	5.0	10W
1N1838	G		Table 4	M									
1N1839	S			G	6.8	1.0	0.085		0.26				
1N1840	S			G	10	1.0	0.077		0.23				
1N1841	S			G	15	1.0	0.063		0.19				
1N1842	S			G	22	1.0	0.05		0.15				
1N1843	S			G	33	1.0	0.04		0.12				
1N1844	S			G	47	1.0	0.03		0.095				
1N1845	S			G	68	1.0	0.023	0.001	0.072				
1N1846	S			G	100	1.0	0.016	0.001	0.050				
1N1847	S			G	150	1.0	0.011	0.003	0.035				
1N1848	S			G	220	4.0	0.009	0.005	0.028				
1N1849	S			G	330	4.0	0.0075	0.005	0.024				
1N1850	S			G	470	4.0	0.006	0.005	0.020				
1N1851	S			G	6.8		0.085		0.26				
1N1852	S			G	10		0.077		0.23				
1N1853	S			G	15		0.063		0.190				
1N1854	S			G	22		0.05		0.150				
1N1855	S			G	33		0.04		0.120				
1N1856	S			G	47		0.03		0.095				
1N1857	S			G	68		0.023	0.001	0.072				
1N1858	S			G	100		0.016	0.001	0.050				
1N1859	S			G	150		0.011	0.003	0.035				
1N1860	S			G	220		0.009	0.005	0.028				
1N1861	S			G	330			0.005	0.024				
1N1862	S			G	470		0.006	0.005	0.020				
1N1863	S			G	6.8		0.085		0.260				
1N1864	S			G	10		0.077		0.230				
1N1865	S			G	15		0.063		0.190				
1N1866	S			G	22		0.05		0.150				
1N1867	S			G	33		0.04		0.120				
1N1868	S			G	47		0.03		0.095				
1N1869	S			G	68		0.023	0.001	0.072				
1N1870	S			G	100		0.016	0.001	0.050				
1N1871	S			G	150		0.011	0.003	0.035				
1N1872	S			G	220		0.009	0.005	0.028				
1N1873	S			G	330			0.005	0.024				
1N1874	S			G	470		0.006	0.005	0.020				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1875	S	1N4738	1N4728	Z						8.2	25	10	1.0W
1N1876	S	1N4740	1N4728	Z						10	25	10	1.0W
1N1877	S	1N4742	1N4728	Z						12	25	10	1.0W
1N1878	S	1N4744	1N4728	Z						15	25	10	1.0W
1N1879	S	1N4746	1N4728	Z						18	25	10	1.0W
1N1880	S	1N4748	1N4728	Z						22	8.0	10	1.0W
1N1881	S	1N4750	1N4728	Z						27	8.0	10	1.0W
1N1882	S	1N4752	1N4728	Z						33	8.0	10	1.0W
1N1883	S	1N4754	1N4728	Z						39	8.0	10	1.0W
1N1884	S	1N4756	1N4728	Z						47	8.0	10	1.0W
1N1885	S	1N4758	1N4728	Z						56	8.0	10	1.0W
1N1886	S	1N4760	1N4728	Z						68	3.0	10	1.0W
1N1887	S	1N4762	1N4728	Z						82	3.0	10	1.0W
1N1888	S	1N4764	1N4728	Z						100	3.0	10	1.0W
1N1889	S	1M120ZS10	1N4728	Z						120	3.0	10	1.0W
1N1890	S	1M150ZS10	1N4728	Z						150	3.0	10	1.0W
1N1891	S	1N2972A	1N2970	Z						8.2	25	10	10W
1N1892	S	1N2974A	1N2970	Z						10	25	10	10W
1N1893	S	1N2976A	1N2970	Z						10	25	10	10W
1N1894	S	1N2979A	1N2970	Z						15	25	10	10W
1N1895	S	1N2982A	1N2970	Z						18	25	10	10W
1N1896	S	1N2985A	1N2970	Z						22	8.0	10	10W
1N1897	S	1N2988A	1N2970	Z						27	8.0	10	10W
1N1898	S	1N2990A	1N2970	Z						33	8.0	10	10W
1N1899	S	1N2992A	1N2970	Z						39	8.0	10	10W
1N1900	S	1N2995A	1N2970	Z						47	8.0	10	10W
1N1901	S	1N2999A	1N2970	Z						56	8.0	10	10W
1N1902	S	1N3001A	1N2970	Z						68	3.0	10	10W
1N1903	S	1N3003A	1N2970	Z						82	3.0	10	10W
1N1904	S	1N3005A	1N2970	Z						100	3.0	10	10W
1N1905	S	1N3008A	1N2970	Z						120	3.0	10	10W
1N1906	S	1N3011A	1N2970	Z						150	3.0	10	10W
1N1907	S	1N4001	1N4001	G	50	1.0	1.5	0.01	30				
1N1908	S	1N4002	1N4001	G	100	1.0	1.5	0.01	30				
1N1909	S	1N4003	1N4001	G	200	1.0	1.5	0.01	30				
1N1910	S			G	300	1.0	1.5	0.01	30				
1N1911	S	1N4004	1N4001	G	400	1.0	1.5	0.01	30				
1N1912	S	1N4005	1N4001	G	500	1.0	1.5	0.01	30				
1N1913	S	1N4005	1N4001	G	600	1.0	1.5	0.01	30				
1N1914	S	1N4006	1N4001	G	700	1.0	1.5	0.01	30				
1N1915	S	1N4006	1N4001	G	800	1.0	1.5	0.01	30				
1N1916	S	1N4007	1N4001	G	900	1.0	1.5	0.01	30				
1N1917	S			G	50	1.0	4.0	0.01	30				
1N1918	S			G	100	1.0	4.0	0.01	30				
1N1919	S			G	200	1.0	4.0	0.01	30				
1N1920	S			G	300	1.0	4.0	0.01	30				
1N1921	S			G	400	1.0	4.0	0.01	30				
1N1922	S			G	500	1.0	4.0	0.01	30				
1N1923	S			G	600	1.0	4.0	0.01	30				
1N1924	S			G	700	1.0	4.0	0.01	30				
1N1925	S			G	800	1.0	4.0	0.01	30				
1N1926	S			G	900	1.0	4.0	0.01	30				
1N1927	S	1N5228A	1N5221	Z						3.9	5.0	10	200m
1N1928	S	1N5230A	1N5221	Z						4.7	5.0	10	200m
1N1929	S	1N5232A	1N5221	Z						5.6	5.0	10	200m
1N1930	S	1N5235A	1N5221	Z						6.8	5.0	10	200m
1N1931	S	1N5237A	1N5221	Z						8.2	5.0	10	200m
1N1932	S	1N5240A	1N5221	Z						10	5.0	10	200m
1N1933	S	1N5242A	1N5221	Z						12	1.0	10	200m
1N1934	S	1N5245A	1N5221	Z						15	1.0	10	200m
1N1935	S	1N5248A	1N5221	Z						18	1.0	10	200m
1N1936	S	1N5251A	1N5221	Z						22	1.0	10	200m
1N1937	S	1N5254A	1N5221	Z						27	1.0	10	200m
1N1938	S	1N5257A	1N5221	Z						33	0.2	10	200m
1N1939	S	1N5259A	1N5221	Z						39	0.2	10	200m
1N1940	S	1N5261A	1N5221	Z						47	0.2	10	200m
1N1941	S	1N5263A	1N5221	Z						56	0.2	10	200m
1N1942	S	1N5266A	1N5221	Z						68	0.2	10	200m
1N1943	S	1N5268A	1N5221	Z						82	0.2	10	200m
1N1944	S	1N5271A	1N5221	Z						100	0.2	10	200m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	ZENER DIODES V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	REFERENCE DIODES V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N1945	S	1N5273A	1N5221	Z						120	0.2	10	200m
1N1946	S	1N5276A	1N5221	Z						150	0.1	10	200m
1N1947	S	1N5279A	1N5221	Z						180	0.1	10	200m
1N1948	S			Z						220	0.1	10	200m
1N1949	S			Z						270	0.1	10	200m
1N1950	S			Z						330	0.1	10	200m
1N1951	S			Z						390	0.1	10	200m
1N1952	S			Z						470	0.1	10	200m
1N1953	S			Z						560	0.1	10	200m
1N1954	S	1N5228A	1N5221	Z						3.9	5.0	10	400m
1N1955	S	1N5230A	1N5221	Z						4.7	5.0	10	400m
1N1956	S	1N5232A	1N5221	Z						5.6	5.0	10	400m
1N1957	S	1N5235A	1N5221	Z						6.8	5.0	10	400m
1N1958	S	1N5237A	1N5221	Z						8.2	5.0	10	400m
1N1959	S	1N5240A	1N5221	Z						10	5.0	10	400m
1N1960	S	1N5242A	1N5221	Z						12	1.0	10	400m
1N1961	S	1N5245A	1N5221	Z						15	1.0	10	400m
1N1962	S	1N5248A	1N5221	Z						18	1.0	10	400m
1N1963	S	1N5251A	1N5221	Z						22	1.0	10	400m
1N1964	S	1N5254A	1N5221	Z						27	1.0	10	400m
1N1965	S	1N5257A	1N5221	Z						33	0.2	10	400m
1N1966	S	1N5259A	1N5221	Z						39	0.2	10	400m
1N1967	S	1N5261A	1N5221	Z						47	0.2	10	400m
1N1968	S	1N5263A	1N5221	Z						56	0.2	10	400m
1N1969	S	1N5266A	1N5221	Z						68	0.2	10	400m
1N1970	S	1N5268A	1N5221	Z						82	0.2	10	400m
1N1971	S	1N5271A	1N5221	Z						100	0.2	10	400m
1N1972	S	1N5273A	1N5221	Z						120	0.2	10	400m
1N1973	S	1N5276A	1N5221	Z						150	0.1	10	400m
1N1974	S	1N5279A	1N5221	Z						180	0.1	10	400m
1N1975	S			Z						220	0.1	10	400m
1N1976	S			Z						270	0.1	10	400m
1N1977	S			Z						330	0.1	10	400m
1N1978	S			Z						390	0.1	10	400m
1N1979	S			Z						470	0.1	10	400m
1N1980	S			Z						560	0.1	10	400m
1N1981	S	1N5228A	1N5221	Z						3.9	5.0	10	150m
1N1982	S	1N5230A	1N5221	Z						4.7	5.0	10	150m
1N1983	S	1N5232A	1N5221	Z						5.6	5.0	10	150m
1N1984	S	1N5235A	1N5221	Z						6.8	5.0	10	150m
1N1985	S	1N5237A	1N5221	Z						8.2	5.0	10	150m
1N1986	S	1N5240A	1N5221	Z						10	5.0	10	150m
1N1987	S	1N5242A	1N5221	Z						12	1.0	10	150m
1N1988	S	1N5245A	1N5221	Z						15	1.0	10	150m
1N1989	S	1N5248A	1N5221	Z						18	1.0	10	150m
1N1990	S	1N5251A	1N5221	Z						22	1.0	10	150m
1N1991	S	1N5254A	1N5221	Z						27	1.0	10	150m
1N1992	S	1N5257A	1N5221	Z						33	0.2	10	150m
1N1993	S	1N5259A	1N5221	Z						39	0.2	10	150m
1N1994	S	1N5261A	1N5221	Z						47	0.2	10	150m
1N1995	S	1N5263A	1N5221	Z						56	0.2	10	150m
1N1996	S	1N5266A	1N5221	Z						68	0.2	10	150m
1N1997	S	1N5268A	1N5221	Z						82	0.2	10	150m
1N1998	S	1N5271A	1N5221	Z						100	0.2	10	150m
1N1999	S	1N5273A	1N5221	Z						120	0.2	10	150m
1N2000	S	1N5276A	1N5221	Z						150	0.1	10	150m
1N2001	S	1N5279A	1N5221	Z						180	0.1	10	150m
1N2002	S			Z						220	0.1	10	150m
1N2003	S			Z						270	0.1	10	150m
1N2004	S			Z						330	0.1	10	150m
1N2005	S			Z						390	0.1	10	150m
1N2006	S			Z						470	0.1	10	150m
1N2007	S			Z						560	0.1	10	150m
★1N2008	S	1N3005A	1N2970	Z						100	50	10	10W
★1N2009	S	1N3007A	1N2970	Z						110	50	10	10W
★1N2010	S	1N3008A	1N2970	Z						120	50	10	10W
★1N2011	S	1N3009A	1N2970	Z						130	50	10	10W
★1N2012	S	1N3011A	1N2970	Z						150	50	10	10W
1N3013	S	1N4001	1N4001	G	50	1.2	0.25	0.25	10				
1N2014	S	1N4002	1N4001	G	100	1.2	0.25	0.25	10				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2015	S	1N4003	1N4001	G	150	1.2	0.25	0.25	10				
1N2016	S	1N4003	1N4001	G	200	1.2	0.25	0.25	10				
1N2017	S	1N4004	1N4001	G	250	1.2	0.25	0.25	10				
1N2018	S	1N4004	1N4001	G	300	1.2	0.25	0.25	10				
1N2019	S	1N4004	1N4001	G	350	1.2	0.25	0.25	10				
1N2020	S	1N4004	1N4001	G	400	1.2	0.25	0.25	10				
1N2021	S	1N1185	1N1183	G	150	1.5	10	5.0	110				
1N2022	S	1N1187	1N1183	G	250	1.5	10	5.0	110				
1N2023	S	1N1187	1N1183	G	300	1.5	10	5.0	110				
1N2024	S	1N1188	1N1183	G	350	1.5	10	5.0	110				
1N2025	S	1N1188	1N1183	G	400	1.5	10	5.0	110				
1N2026	S	MR1120	MR1120	G	50	2.0	1.0	0.5	25				
1N2027	S	MR1122	MR1120	G	200	2.0	1.0	0.5	25				
1N2028	S	MR1123	MR1120	G	300	2.0	1.0	0.5	25				
1N2029	S	MR1124	MR1120	G	400	2.0	1.0	0.5	25				
1N2030	S	MR1125	MR1120	G	500	2.0	1.0	0.5	25				
1N2031	S	MR1126	MR1120	G	600	2.0	1.0	0.5	25				
★1N2032	S	1N4732	1N4728	Z						4.4	10	5.0	750m
★1N2033	S	1N4734	1N4728	Z						5.6	10	5.0	750m
★1N2034	S	1N4736	1N4728	Z						6.6	10	5.0	750m
★1N2035	S	1N4739	1N4728	Z						8.8	10	5.0	750m
★1N2036	S	1N4740	1N4728	Z						10.5	5.0	5.0	750m
★1N2037	S	1N4743	1N4728	Z						12.8	5.0	5.0	750m
★1N2038	S	1N4745	1N4728	Z						15.8	5.0	5.0	750m
★1N2039	S	1N4747	1N4728	Z						19	5.0	5.0	750m
★1N2040	S	1N4749	1N4728	Z						23.5	5.0	5.0	750m
★1N2041	S	1N3995	1N3993	Z						4.9	1.0	5.0	10W
★1N2042	S	1N3997	1N3993	Z						5.8	1.0	5.0	10W
★1N2043	S	1N2970RA	1N2970	Z						6.6	1.0	5.0	10W
★1N2044	S	1N2973RA	1N2970	Z						8.8	500	5.0	10W
★1N2045	S	1N2974RB	1N2970	Z						10.5	500	5.0	10W
★1N2046	S	1N2977RA	1N2970	Z						12.8	500	5.0	10W
★1N2047	S	1N2980RA	1N2970	Z						15.8	500	5.0	10W
★1N2048	S	1N2983RA	1N2970	Z						19	500	5.0	10W
★1N2049	S	1N2986RA	1N2970	Z						23.5	150	5.0	10W
1N2054	S	MR1230SB	MR1230	G	50	1.6	250	55	4500				
1N2055	S	MR1231SB	MR1230	G	100	1.6	250	55	4500				
1N2056	S	MR1232SB	MR1230	G	150	1.6	250	55	4500				
1N2057	S	MR1233SB	MR1230	G	200	1.6	250	55	4500				
1N2058	S	MR1234SB	MR1230	G	250	1.6	250	55	4500				
1N2059	S	MR1235SB	MR1230	G	300	1.6	250	55	4500				
1N2060	S	MR1236SB	MR1230	G	350	1.6	250	55	4500				
1N2061	S	MR1237SB	MR1230	G	400	1.6	250	55	4500				
1N2062	S	MR1238SB	MR1230	G	450	1.6	250	55	4500				
1N2063	S	MR1238SB	MR1230	G	500	1.6	250	55	4500				
1N2064	S	MR1239SB	MR1230	G	600	1.6	250	55	4500				
1N2065	S			G	700	1.6	250	55	4500				
1N2066	S			G	800	1.6	250	55	4500				
1N2067	S			G	900	1.6	250	55	4500				
1N2068	S			G	1000	1.6	250	55	4500				
1N2069	S	1N4003	1N4001	G	200	0.6	0.75	0.2	22				
1N2069A	S	1N4003	1N4001	G	200	0.5	0.75	0.05	22				
1N2070	S	1N4004	1N4001	G	400	0.6	0.75	0.2	22				
1N2070A	S	1N4004	1N4001	G	400	0.5	0.75	0.05	22				
1N2071	S	1N4005	1N4001	G	600	0.6	0.75	0.2	22				
1N2071A	S	1N4005	1N4001	G	600	0.5	0.75	0.05	22				
1N2072	S	1N4001	1N4001	G	50	1.1	0.625	0.25	30				
1N2073	S	1N4002	1N4001	G	100	1.1	0.625	0.25	30				
1N2074	S	1N4003	1N4001	G	150	1.1	0.625	0.25	30				
1N2075	S	1N4003	1N4001	G	200	1.1	0.625	0.25	30				
1N2076	S	1N4004	1N4001	G	250	1.1	0.625	0.25	30				
1N2077	S	1N4004	1N4001	G	300	1.1	0.625	0.25	30				
1N2078	S	1N4004	1N4001	G	400	1.1	0.625	0.25	30				
1N2079	S	1N4005	1N4001	G	500	1.1	0.625	0.25	30				
1N2080	S	1N4001	1N4001	G	50	0.75	0.5	0.35	15				
1N2081	S	1N4002	1N4001	G	100	0.75	0.5	0.35	15				
1N2082	S	1N4003	1N4001	G	200	0.75	0.5	0.35	15				
1N2083	S	1N4004	1N4001	G	300	0.75	0.5	0.35	15				
1N2084	S	1N4004	1N4001	G	400	0.75	0.5	0.35	15				
1N2085	S	1N4005	1N4001	G	500	0.75	0.5	0.35	15				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2086	S	1N4005	1N4001	G	600	0.75	0.5	0.35	15				
1N2088	S			G	500	1.2	0.75	0.5	30				
1N2089	S			G	600	1.2	0.75	0.5	30				
1N2090	S			G	50	0.5	0.5	0.25	15				
1N2091	S			G	100	0.5	0.5	0.25	15				
1N2092	S			G	200	0.5	0.5	0.25	15				
1N2093	S			G	300	0.5	0.5	0.25	15				
1N2094	S			G	400	0.5	0.5	0.25	15				
1N2095	S			G	500	0.5	0.5	0.25	15				
1N2096	S			G	600	0.5	0.5	0.25	15				
1N2102	S		Table 4	M									
1N2103	S	1N4001	1N4001	G	50	1.2	0.75	0.3	10				
1N2104	S	1N4002	1N4001	G	100	1.2	0.75	0.3	10				
1N2105	S	1N4003	1N4001	G	200	1.2	0.75	0.3	10				
1N2106	S	1N4004	1N4001	G	300	1.2	0.75	0.3	10				
1N2107	S	1N4004	1N4001	G	400	1.2	0.75	0.3	10				
1N2108	S	1N4005	1N4001	G	500	1.2	0.75	0.3	10				
1N2109	S			G	50	1.2	2.0	0.3	10				
1N2110	S			G	100	1.2	2.0	0.3	10				
1N2111	S			G	200	1.2	2.0	0.3	10				
1N2112	S			G	300	1.2	2.0	0.3	10				
1N2113	S			G	400	1.2	2.0	0.3	10				
1N2114	S			G	500	1.2	2.0	0.3	10				
1N2115	S	1N4004	1N4001	G	365	0.8	0.2	0.25	10				
1N2116	S			G	400	1.4	0.5	0.4	15				
1N2117	S	1N4006	1N4001	G	720	1.3	0.75	0.010	15				
1N2127	S		Table 4	M									
1N2127A	S		Table 4	M									
1N2128	S	MR1200FL	MR1200	G	50	2.0	60	10	700				
1N2128A	S	MR1200FL	MR1200	G	50	2.0	60	10	900				
1N2129	S	MR1201FL	MR1200	G	100	2.0	60	10	700				
1N2129A	S	MR1201FL	MR1200	G	100	2.0	60	10	900				
1N2130	S	MR1202FL	MR1200	G	150	2.0	60	10	700				
1N2130A	S	MR1202FL	MR1200	G	150	2.0	60	10	900				
1N2131	S	MR1203FL	MR1200	G	200	2.0	60	10	700				
1N2131A	S	MR1203FL	MR1200	G	200	2.0	60	10	900				
1N2132	S	MR1204FL	MR1200	G	250	2.0	60	10	700				
1N2132A	S	MR1204FL	MR1200	G	250	2.0	60	10	900				
1N2133	S	MR1205FL	MR1200	G	300	2.0	60	10	700				
1N2133A	S	MR1205FL	MR1200	G	300	2.0	60	10	900				
1N2134	S	MR1206FL	MR1200	G	350	2.0	60	10	700				
1N2134A	S	MR1206FL	MR1200	G	350	2.0	60	10	900				
1N2135	S	MR1207FL	MR1200	G	400	2.0	60	10	700				
1N2135A	S	MR1207FL	MR1200	G	400	2.0	60	10	900				
1N2136	S			G	450	2.0	60	10	700				
1N2136A	S			G	450	2.0	60	10	900				
1N2137	S			G	500	2.0	60	10	700				
1N2137A	S			G	500	2.0	60	10	900				
1N2138	S			G	600	2.0	60	10	700				
1N2138A	S			G	600	2.0	60	10	900				
1N2139	S			G	20k	60	0.052	0.2	3.5				
1N2146	S			S	120	1.1	500m	1.0*	0.1				
1N2147	S			G	50	1.2	6.0	0.5	150				
1N2147A	S			G	50	1.0	6.0	0.1	150				
1N2148	S			G	100	1.2	6.0	0.5	150				
1N2148A	S			G	100	1.0	6.0	0.1	150				
1N2149	S			G	200	1.2	6.0	0.5	150				
1N2149A	S			G	200	1.0	6.0	0.1	150				
1N2150	S			G	300	1.2	6.0	0.5	150				
1N2150A	S			G	300	1.0	6.0	0.1	150				
1N2151	S			G	400	1.2	6.0	0.5	150				
1N2151A	S			G	400	1.0	6.0	0.1	150				
1N2152	S			G	500	1.2	6.0	0.5	150				
1N2152A	S			G	500	1.0	6.0	0.1	150				
1N2153	S			G	600	1.2	6.0	0.5	150				
1N2153A	S			G	600	1.0	6.0	0.1	150				
1N2154	S	1N1183	1N1183	G	50	0.6	25	5.0	300				
1N2155	S	1N1184	1N1183	G	100	0.6	25	4.5	300				
1N2156	S	1N1186	1N1183	G	200	0.6	25	4.0	300				
1N2157	S	1N1187	1N1183	G	300	0.6	25	3.5	300				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2158	S	1N1188	1N1183	G	400	0.6	25	3.0	300				
1N2159	S	1N1189	1N1183	G	500	0.6	25	2.5	300				
1N2160	S	1N1190	1N1183	G	600	0.6	25	2.0	300				
★1N2163	S		1N2163	G						9.4	0.05	10	0/+70
★1N2163A	S		1N2163	G						9.4	0.05	10	0/+70
★1N2164	S		1N2163	G						9.4	0.05	10	-55/+125
★1N2164A	S		1N2163	G						9.4	0.05	10	-55/+125
★1N2165	S		1N2163	G						9.4	0.05	10	-55/+185
★1N2165A	S		1N2163	G						9.4	0.05	10	-55/+185
★1N2166	S		1N2163	G						9.4	0.001	10	0/+70
★1N2166A	S		1N2163	G						9.4	0.001	10	0/+70
★1N2167	S		1N2163	G						9.4	0.001	10	-55/+125
★1N2167A	S		1N2163	G						9.4	0.001	10	-55/+125
★1N2168	S		1N2163	R						9.4	0.001	10	-55/+185
★1N2168A	S		1N2163	R						9.4	0.001	10	-55/+185
★1N2169	S		1N2163	R						9.4	0.0005	10	0/+70
★1N2169A	S		1N2163	R						9.4	0.0005	10	0/+70
★1N2170	S		1N2163	R						9.4	0.0005	10	-55/+125
★1N2170A	S		1N2163	R						9.4	0.0005	10	-55/+125
★1N2171	S		1N2163	R						9.4	0.0005	10	-55/+185
★1N2171A	S		1N2163	R						9.4	0.0005	10	-55/+185
1N2172	S			G	50	1.5	50	0.25	525				
1N2173	S			G	100	1.5	50	0.25	525				
1N2174	S			G	200	1.5	50	0.25	525				
1N2175				D									
1N2176	S			G	50	1.1	3.0	0.3	15				
1N2177	S			G	100	1.1	3.0	0.3	15				
1N2178	S			G	150	1.1	3.0	0.3	15				
1N2179	S			G	200	1.1	3.0	0.3	15				
1N2180	S			G	300	1.1	3.0	0.3	15				
1N2181	S			G	400	1.1	3.0	0.3	15				
1N2182	S			G	500	1.1	3.0	0.3	15				
1N2183	S			G	600	1.1	3.0	0.3	15				
1N2184	S			G	50	1.5	3.0	5.0	40				
1N2185	S			G	100	1.5	3.0	5.0	40				
1N2186	S			G	150	1.5	3.0	5.0	40				
1N2187	S			G	200	1.5	3.0	5.0	40				
1N2188	S			G	300	1.5	3.0	5.0	40				
1N2189	S			G	400	1.5	3.0	5.0	40				
1N2190	S			G	500	1.5	3.0	5.0	40				
1N2191	S			G	600	1.5	3.0	5.0	40				
1N2192	S			G	800	1.5	3.0	5.0	40				
1N2193	S			G	1000	1.5	3.0	5.0	40				
1N2194	S			G	50	1.25	6.0	10	100				
1N2195	S			G	100	1.25	6.0	10	100				
1N2196	S			G	150	1.25	6.0	10	100				
1N2197	S			G	200	1.25	6.0	10	100				
1N2198	S			G	300	1.25	6.0	10	100				
1N2199	S			G	400	1.25	6.0	10	100				
1N2200	S			G	500	1.25	6.0	10	100				
1N2201	S			G	600	1.25	6.0	10	100				
1N2202	S			G	800	1.25	6.0	10	100				
1N2203	S			G	1000	1.25	6.0	10	100				
1N2204	S			G	50	1.25	12	10	200				
1N2205	S			G	100	1.25	12	10	200				
1N2206	S			G	150	1.25	12	10	200				
1N2207	S			G	200	1.25	12	10	200				
1N2208	S			G	300	1.25	12	10	200				
1N2209	S			G	400	1.25	12	10	200				
1N2210	S			G	500	1.25	12	10	200				
1N2211	S			G	600	1.25	12	10	200				
1N2212	S			G	800	1.25	12	10	200				
1N2213	S			G	1000	1.25	12	10	200				
1N2214	S			Z						5.6	35		1.0W
1N2217	S	MR1120	MR1120	G	50		1.5	0.003	20				
1N2218	S	MR1125	MR1120	G	500	1.2	0.4	0.003	20				
1N2219	S			G	500		1.5	0.003	20				
1N2220	S	MR1126	MR1120	G	600	1.2	0.4	0.003	20				
1N2221	S			G	600		1.5	0.003	20				
1N2222	S	MR1128	MR1120	G	800	1.2	0.3	0.003	20				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2222A	S			G	800	1.2	0.3	0.003	20				
1N2223	S			G	800		1.0	0.003	20				
1N2223A	S			G	800		1.0	0.003	20				
1N2224	S	MR1130	MR1120	G	1000	1.2	0.3	0.003	20				
1N2224A	S			G	1000	1.2	0.3	0.003	20				
1N2225	S			G	1000		1.0	0.003	20				
1N2225A	S			G	1000		1.0	0.003	20				
1N2226	S			G	1200	1.2	0.3	0.003	20				
1N2226A	S			G	1200	1.2	0.3	0.003	20				
1N2227	S			G	1200		1.0	0.003	20				
1N2227A	S			G	1200		1.0	0.003	20				
1N2228	S	MR1120	MR1120	G	50	1.2	1.0	0.003	100				
1N2228A	S	MR1120	MR1120	G	50	1.2	1.6	0.003	100				
1N2229	S			G	50		5.0	0.003	100				
1N2229A	S			G	50		5.0	0.003	100				
1N2230	S	MR1122	MR1120	G	200	1.2	1.0	0.003	100				
1N2230A	S	MR1122	MR1120	G	200	1.2	1.6	0.003	100				
1N2231	S			G	200		5.0	0.003	100				
1N2231A	S	MR1123	MR1120	G	200		5.0	0.003	100				
1N2232	S	MR1123	MR1120	G	300	1.2	1.0	0.003	100				
1N2232A	S			G	300	1.2	1.6	0.003	100				
1N2233	S			G	300		5.0	0.003	100				
1N2233A	S			G	300		5.0	0.003	100				
1N2234	S	MR1124	MR1120	G	400	1.2	1.0	0.003	100				
1N2234A	S	MR1124	MR1120	G	400	1.2	1.6	0.003	100				
1N2235	S			G	400		5.0	0.003	100				
1N2235A	S			G	400		5.0	0.003	100				
1N2236	S	MR1125	MR1120	G	500	1.2	1.0	0.003	100				
1N2236A	S	MR1125	MR1120	G	500	1.2	1.6	0.003	100				
1N2237	S			G	500		5.0	0.003	100				
1N2237A	S			G	500		5.0	0.003	100				
1N2238	S	MR1126	MR1120	G	600	1.2	1.0	0.003	100				
1N2238A	S	MR1126	MR1120	G	600	1.2	1.6	0.003	100				
1N2239	S			G	600		5.0	0.003	100				
1N2239A	S			G	600		5.0	0.003	100				
1N2240	S	MR1128	MR1120	G	800	1.2	1.5	0.003	100				
1N2240A	S	MR1128	MR1120	G	800	1.2	1.5	0.003	100				
1N2241	S			G	800		5.0	0.003	100				
1N2241A	S			G	800		5.0	0.003	100				
1N2242	S	MR1130	MR1120	G	1000	1.2	1.5	0.003	100				
1N2242A	S	MR1130	MR1120	G	1000	1.2	1.6	0.003	100				
1N2243	S			G	1000		5.0	0.003	100				
1N2243A	S			G	1000		5.0	0.003	100				
1N2244	S			G	1200	1.2	1.5	0.003	100				
1N2244A	S			G	1200	1.2	1.6	0.003	100				
1N2245	S			G	1200		5.0	0.003	100				
1N2245A	S			G	1200		5.0	0.003	100				
1N2246	S			G	50	1.2	3.0	0.005	200				
1N2246A	S			G	50	1.2	3.0	0.003	200				
1N2247	S			G	50		10	0.005	200				
1N2247A	S			G	50		10	0.003	200				
1N2248	S			G	100	1.2	3.0	0.005	200				
1N2248A	S			G	100	1.2	3.0	0.003	200				
1N2249	S			G	100		10	0.005	200				
1N2249A	S			G	100		10	0.003	200				
1N2250	S			G	200	1.2	3.0	0.005	200				
1N2250A	S			G	200	1.2	3.0	0.003	200				
1N2251	S			G	200		5.0	0.005	200				
1N2251A	S			G	200		10	0.003	200				
1N2252	S			G	300	1.2	3.0	0.005	200				
1N2252A	S			G	300	1.2	3.0	0.003	200				
1N2253	S			G	300		10	0.005	200				
1N2253A	S			G	300		10	0.003	200				
1N2254	S			G	400	1.2	3.0	0.005	200				
1N2254A	S			G	400	1.2	3.0	0.003	200				
1N2255	S			G	400		10	0.005	200				
1N2255A	S			G	400		10	0.003	200				
1N2256	S			G	500	1.2	3.0	0.005	200				
1N2256A	S			G	500	1.2	3.0	0.003	200				
1N2257	S			G	500		10	0.005	200				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2257A	S			G	500		10	0.005	200				
1N2258	S			G	600	1.2	3.0	0.005	200				
1N2258A	S			G	600	1.2	3.0	0.003	200				
1N2259	S			G	600		10	0.005	200				
1N2259A	S			G	600		10	0.003	200				
1N2260	S			G	800	1.2	3.0	0.003	200				
1N2260A	S			G	800	1.2	3.0	0.005	200				
1N2261	S			G	800		10	0.01	200				
1N2261A	S			G	800		10	0.005	200				
1N2262	S			G	1000	1.2	3.0	0.010	200				
1N2262A	S			G	1000	1.2	3.0	0.005	200				
1N2263	S			G	1000		10	0.01	200				
1N2263A	S			G	1000		10	0.005	200				
1N2264	S			G	1200	1.2	3.0	0.010	200				
1N2264A	S			G	1200	1.2	3.0	0.005	200				
1N2265	S			G	1200		10	0.01	200				
1N2265A	S			G	1200		10	0.005	200				
1N2266	S	MR1120	MR1120	G	50	1.2	0.3	0.003	20				
1N2267	S			G	50		1.0	0.003	20				
1N2268	S	MR1125	MR1120	G	500	1.2	0.3	0.003	20				
1N2269	S			G	500		1.0	0.003	20				
1N2270	S	MR1126	MR1120	G	600	1.2	0.3	0.003	20				
1N2271	S			G	600		1.0	0.003	20				
1N2272	S	MR1120	MR1120	G	50	1.2	6.0	1.0	400				
1N2273	S	MR1121	MR1120	G	100	1.2	6.0	1.0	400				
1N2274	S	MR1122	MR1120	G	200	1.2	6.0	1.0	400				
1N2275	S	MR1123	MR1120	G	300	1.2	6.0	1.0	400				
1N2276	S	MR1124	MR1120	G	400	1.2	6.0	1.0	400				
1N2277	S	MR1125	MR1120	G	500	1.2	6.0	1.0	400				
1N2278	S	MR1126	MR1120	G	600	1.2	6.0	1.0	400				
1N2279	S	MR1128	MR1120	G	800	1.2	6.0	1.0	400				
1N2280	S			G	1000	1.2	6.0	1.0	400				
1N2281	S			G	1200	1.2	6.0	1.0	400				
1N2282	S			G	300	1.5	20	5.0	400				
1N2283	S			G	400	1.5	20	5.0	400				
1N2284	S			G	500	1.5	20	5.0	400				
1N2285	S			G	600	1.5	20	5.0	400				
1N2286	S			G	800	1.5	20	5.0	400				
1N2287	S			G	1000	1.5	20	5.0	400				
1N2288	S			G	1200	1.5	20	5.0	400				
1N2289	S			G	100		1.5	0.003	20				
1N2289A	S			G	100		1.5	0.003	20				
1N2290	S			G	100		5.0	0.003	100				
1N2290A	S			G	100		5.0	0.003	100				
1N2291	S			G	200		1.5	0.003	20				
1N2291A	S			G	200		1.5	0.003	20				
1N2292	S			G	300		1.5	0.003	20				
1N2292A	S			G	300		1.5	0.003	20				
1N2293	S			G	400		1.5	0.003	20				
1N2293A	S			G	400		1.5	0.003	20				
1N2294	S			G	50	1.1	22	10	160				
1N2295	S			G	100	1.1	22	10	160				
1N2296	S			G	150	1.1	22	10	160				
1N2297	S			G	200	1.1	22	10	160				
1N2298	S			G	250	1.1	22	10	160				
1N2299	S			G	300	1.1	22	10	160				
1N2300	S			G	350	1.1	22	10	160				
1N2301	S			G	400	1.1	22	10	160				
1N2302	S			G	50	1.1	22	10	160				
1N2303	S			G	100	1.1	22	10	160				
1N2304	S			G	150	1.1	22	10	160				
1N2305	S			G	200	1.1	22	10	160				
1N2306	S			G	250	1.1	22	10	160				
1N2307	S			G	300	1.1	22	10	160				
1N2308	S			G	350	1.1	22	10	160				
1N2309	S			G	400	1.1	22	10	160				
1N2310	S			G	50	1.1	35	20	300				
1N2311	S			G	100	1.1	35	20	300				
1N2312	S			G	150	1.1	35	20	300				
1N2313	S			G	200	1.1	35	20	300				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2314	S			G	250	1.1	35	20	300				
1N2315	S			G	300	1.1	35	20	300				
1N2316	S			G	350	1.1	35	20	300				
1N2317	S			G	400	1.1	35	20	300				
1N2318	S			G	50	1.1	35	20	300				
1N2319	S			G	100	1.1	35	20	300				
1N2320	S			G	150	1.1	35	20	300				
1N2321	S			G	200	1.1	35	20	300				
1N2322	S			G	250	1.1	35	20	300				
1N2323	S			G	300	1.1	35	20	300				
1N2324	S			G	350	1.1	35	20	300				
1N2325	S			G	400	1.1	35	20	300				
1N2326	G			S	1.0	0.150	2.0m						
1N2327	S			S	300	3.3	400m	1.5*					
1N2328	S			S	300	3.3	400m	1.5*					
1N2348	S	MR1120	MR1120	G	50	1.1	3.0	0.3	15				
1N2349	S	MR1121	MR1120	G	100	1.1	3.0	0.3	15				
1N2350	S	MR1122	MR1120	G	150	1.1	3.0	0.3	15				
1N2357	S			G	1400		0.4	0.001	15				
1N2358	S			G	1500		0.4	0.001	15				
1N2359	S			G	1600		0.4	0.001	15				
1N2360	S			G	1800		0.4	0.001	15				
1N2361	S			G	2000		0.4	0.001	15				
1N2362	S			G	1400		1.0	0.001	15				
1N2362A	S			G	1400		5.0	0.001	20				
1N2362B	S			G	1400		10	0.001	25				
1N2363	S			G	1400		1.0	0.001	15				
1N2363A	S			G	1400		5.0	0.001	20				
1N2363B	S			G	1400		10	0.001	25				
1N2364	S			G	1500		1.0	0.001	15				
1N2364A	S			G	1500		5.0	0.001	20				
1N2364B	S			G	1500		10	0.001	25				
1N2365	S			G	1500		1.0	0.001	15				
1N2365A	S			G	1500		5.0	0.001	20				
1N2365B	S			G	1500		10	0.001	25				
1N2366	S			G	1600		1.0	0.001	15				
1N2366A	S			G	1600		5.0	0.001	20				
1N2366B	S			G	1600		10	0.001	25				
1N2367	S			G	1600		1.0	0.001	15				
1N2367A	S			G	1600		5.0	0.001	20				
1N2367B	S			G	1600		10	0.001	25				
1N2368	S			G	1800		1.0	0.001	15				
1N2368A	S			G	1800		5.0	0.001	20				
1N2368B	S			G	1800		10	0.001	25				
1N2369	S			G	1800		1.0	0.001	15				
1N2369A	S			G	1800		5.0	0.001	20				
1N2369B	S			G	1800		10	0.001	25				
1N2370	S			G	2000		1.0	0.001	15				
1N2370A	S			G	2000		5.0	0.001	20				
1N2370B	S			G	2000		10	0.001	25				
1N2371	S			G	2000		1.0	0.001	15				
1N2371A	S			G	2000		5.0	0.001	20				
1N2371B	S			G	2000		10	0.001	25				
1N2372	S			G	1000	2.0	0.2	0.5	12				
1N2373	S	1N4005	1N4001	G	600	3.0	0.1	0.250	12				
1N2374	S	1N4007	1N4001	G	1000	3.0	0.1	0.250	12				
1N2375	S	MR991A	MR990A	G	1500	4.5	0.1	0.250	12				
1N2376	S	MR992A	MR990A	G	2000	7.5	0.1	0.250	12				
1N2377	S	MR993A	MR990A	G	2400	9.0	0.075	0.250	12				
1N2378	S	MR994A	MR990A	G	3000	9.0	0.075	0.250	12				
1N2379	S	MR995A	MR990A	G	4000	15.0	0.05	0.250	12				
1N2380	S	1N2383	1N1730	G	6000	22.5	0.05	0.250	12				
1N2381	S	1N2385	1N1730	G	10k	37.5	0.025	0.025	12				
★1N2382	S		1N1730	G	4000	18	0.15	0.2	6.0				
1N2382A	S			G	4000	6.0	0.35	0.2	6.0				
★1N2383	S		1N1730	G	6000	27	0.1	0.2	6.0				
1N2383A	S			G	6000	9.0	0.35	0.2	6.0				
★1N2384	S		1N1730	G	8000	27	0.07	0.2	6.0				
1N2384A	S			G	8000	12	0.275	0.2	6.0				
★1N2385	S		1N1730	G	10k	39	0.07	0.2	6.0				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	ZENER DIODES V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	REFERENCE DIODES V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2385A	S			G	10k	15	0.2	0.2	6.0				
1N2386	G			S	5.0								
1N2387	S	1N4751	1N4728	Z						30	8.0	10	1.0W
1N2389	S			G	1600	4.8	0.6	0.5	15				
1N2390	S			G	50	1.2	1.5	0.3	35				
1N2391	S			G	100	1.2	1.5	0.3	35				
1N2392	S			G	200	1.2	1.5	0.3	35				
1N2393	S			G	300	1.2	1.5	0.3	35				
1N2394	S			G	400	1.2	1.5	0.3	35				
1N2395	S			G	500	1.2	1.5	0.3	35				
1N2396	S			G	600	1.2	1.5	0.3	35				
1N2397	S			G	700	1.2	1.5	0.3	35				
1N2398	S			G	800	1.2	1.5	0.3	35				
1N2399	S			G	50	1.2	1.5	0.3	35				
1N2400	S			G	100	1.2	1.5	0.3	35				
1N2401	S			G	200	1.2	1.5	0.3	35				
1N2402	S			G	300	1.2	1.5	0.3	35				
1N2403	S			G	400	1.2	1.5	0.3	35				
1N2404	S			G	500	1.2	1.5	0.3	35				
1N2405	S			G	600	1.2	1.5	0.3	35				
1N2406	S			G	700	1.2	1.5	0.3	35				
1N2407	S			G	800	1.2	1.5	0.3	35				
1N2408	S			G	50	1.2	1.5	0.3	35				
1N2409	S			G	100	1.2	1.5	0.3	35				
1N2410	S			G	200	1.2	1.5	0.3	35				
1N2411	S			G	300	1.2	1.5	0.3	35				
1N2412	S			G	400	1.2	1.5	0.3	35				
1N2413	S			G	500	1.2	1.5	0.3	35				
1N2414	S			G	600	1.2	1.5	0.3	35				
1N2415	S			G	700	1.2	1.5	0.3	35				
1N2416	S			G	800	1.2	1.5	0.3	35				
1N2417	S			G	50	1.2	1.5	0.3	35				
1N2418	S			G	100	1.2	1.5	0.3	35				
1N2419	S			G	200	1.2	1.5	0.3	35				
1N2420	S			G	300	1.2	1.5	0.3	35				
1N2421	S			G	400	1.2	1.5	0.3	35				
1N2422	S			G	500	1.2	1.5	0.3	35				
1N2423	S			G	600	1.2	1.5	0.3	35				
1N2424	S			G	700	1.2	1.5	0.3	35				
1N2425	S			G	800	1.2	1.5	0.3	35				
1N2482	S	1N4003	1N4001	G	200	1.2	0.75	0.5	30				
1N2483	S	1N4004	1N4001	G	400	1.2	0.75	0.5	30				
1N2484	S	1N4005	1N4001	G	500	1.2	0.75	0.5	30				
1N2485	S	1N4003	1N4001	G	200	1.2	0.75	0.5	30				
1N2486	S	1N4004	1N4001	G	300	1.2	0.75	0.5	30				
1N2487	S	1N4004	1N4001	G	400	1.2	0.75	0.5	30				
1N2488	S	1N4005	1N4001	G	500	1.2	0.75	0.5	30				
1N2489	S	1N4005	1N4001	G	600	1.2	0.75	0.5	30				
1N2490	S			G	1600	4.8	0.5	0.5	15				
1N2491	S	MR1120	MR1120	G	50	1.5	6.0	2.0	150				
1N2492	S	MR1121	MR1120	G	100	1.5	6.0	2.0	150				
1N2493	S	MR1122	MR1120	G	200	1.5	6.0	2.0	150				
1N2494	S	MR1123	MR1120	G	300	1.5	6.0	2.0	150				
1N2495	S	MR1124	MR1120	G	400	1.5	6.0	2.0	150				
1N2496	S	MR1125	MR1120	G	500	1.5	6.0	2.0	150				
1N2497	S	MR1126	MR1120	G	600	1.5	6.0	2.0	150				
★1N2498	S	1N2974A	1N2970	Z						10	500	10	10W
★1N2498A	S	1N2974B	1N2970	Z						10	500	5.0	10W
★1N2499	S	1N2975A	1N2970	Z						11	500	10	10W
★1N2499A	S	1N2975B	1N2970	Z						11	500	5.0	10W
★1N2500	S	1N2976A	1N2970	Z						12	500	10	10W
1N2500A	S	1N2976B	1N2970	Z						12	500	5.0	10W
1N2501	S	1N4006	1N4001	G	800	1.7	0.15	0.2	2.5				
1N2502	S	1N4007	1N4001	G	1000	1.7	0.15	0.2	2.5				
1N2503	S			G	1200	1.7	0.15	0.2	2.5				
1N2504	S			G	1500	1.7	0.15	0.2	2.5				
1N2505	S	1N4006	1N4001	G	800	1.7	0.3	0.2	2.5				
1N2506	S	1N4006	1N4001	G	1000	1.7	0.3	0.2	2.5				
1N2507	S			G	1200	1.7	0.3	0.2	2.5				
1N2508	S			G	1500	1.7	0.3	0.2	2.5				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2509	S		Table 4	M									
1N2510	S		Table 4	M									
1N2512	S	MR1121	MR1120	G	100	1.1	4.0	0.002	30				
1N2513	S	MR1122	MR1120	G	200	1.1	4.0	0.002	30				
1N2514	S	MR1123	MR1120	G	300	1.1	4.0	0.002	30				
1N2515	S	MR1124	MR1120	G	400	1.1	4.0	0.002	30				
1N2516	S	MR1125	MR1120	G	500	1.1	4.0	0.002	30				
1N2517	S	MR1125	MR1120	G	600	1.1	4.0	0.002	30				
1N2518	S			G	100	1.1		0.002	30				
1N2519	S			G	200	1.1		0.002	30				
1N2520	S			G	300	1.1		0.002	30				
1N2521	S			G	400	1.1		0.002	30				
1N2522	S			G	500	1.1		0.002	30				
1N2523	S			G	600	1.1		0.002	30				
1N2524	S			G	50	1.2	2.5	0.5	50				
1N2525	S			G	100	1.2	2.5	0.5	50				
1N2526	S			G	200	1.2	2.5	0.5	50				
1N2527	S			G	300	1.2	2.5	0.5	50				
1N2528	S			G	400	1.2	2.5	0.5	50				
1N2529	S			G	500	1.2	2.5	0.5	50				
1N2530	S			G	600	1.2	2.5	0.5	50				
1N2531	S			G	700	1.2	2.5	0.5	50				
1N2532	S			G	800	1.2	2.5	0.5	50				
1N2533	S			G	900	1.2	2.5	0.5	50				
1N2534	S			G	1000	1.2	2.5	0.5	50				
1N2535	S			G	50	1.0	2.5	0.1	50				
1N2536	S			G	100	1.0	2.5	0.1	50				
1N2537	S			G	200	1.0	2.5	0.1	50				
1N2538	S			G	300	1.0	2.5	0.1	50				
1N2539	S			G	400	1.0	2.5	0.1	50				
1N2540	S			G	500	1.0	2.5	0.1	50				
1N2541	S			G	600	1.0	2.5	0.1	50				
1N2542	S			G	700	1.0	2.5	0.1	50				
1N2543	S			G	800	1.0	2.5	0.1	50				
1N2544	S			G	900	1.0	2.5	0.1	50				
1N2545	S			G	1000	1.0	2.5	0.1	50				
1N2546	S			G	50	1.5	2.5	1.0	50				
1N2547	S			G	100	1.5	2.5	1.0	50				
1N2548	S			G	200	1.5	2.5	1.0	50				
1N2549	S			G	300	1.5	2.5	1.0	50				
1N2550	S			G	400	1.5	2.5	1.0	50				
1N2551	S			G	500	1.5	2.5	1.0	50				
1N2552	S			G	600	1.5	2.5	1.0	50				
1N2553	S			G	700	1.5	2.5	1.0	50				
1N2554	S			G	800	1.5	2.5	1.0	50				
1N2555	S			G	900	1.5	2.5	1.0	50				
1N2556	S			G	1000	1.5	2.5	1.0	50				
1N2557	S			G	700	1.2	6.0	0.5	150				
1N2558	S			G	800	1.2	6.0	0.5	150				
1N2559	S			G	900	1.2	6.0	0.5	150				
1N2560	S			G	1000	1.2	6.0	0.5	150				
1N2561	S			G	700	1.0	6.0	0.1	150				
1N2562	S			G	800	1.0	6.0	0.1	150				
1N2563	S			G	900	1.0	6.0	0.1	150				
1N2564	S			G	1000	1.0	6.0	0.1	150				
1N2565	S			G	50	1.5	6.0	1.0	150				
1N2566	S			G	100	1.5	6.0	1.0	150				
1N2567	S			G	200	1.5	6.0	1.0	150				
1N2568	S			G	300	1.5	6.0	1.0	150				
1N2569	S			G	400	1.5	6.0	1.0	150				
1N2570	S			G	500	1.5	6.0	1.0	150				
1N2571	S			G	600	1.5	6.0	1.0	150				
1N2572	S			G	700	1.5	6.0	1.0	150				
1N2573	S			G	800	1.5	6.0	1.0	150				
1N2574	S			G	900	1.5	6.0	1.0	150				
1N2575	S			G	1000	1.5	6.0	1.0	150				
1N2576	S			G	50	1.2	12	1.0	250				
1N2577	S			G	100	1.2	12	1.0	250				
1N2578	S			G	200	1.2	12	1.0	250				
1N2579	S			G	300	1.2	12	1.0	250				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2580	S			G	400	1.2	12	1.0	250				
1N2581	S			G	500	1.2	12	1.0	250				
1N2582	S			G	600	1.2	12	1.0	250				
1N2583	S			G	700	1.2	12	1.0	250				
1N2584	S			G	800	1.2	12	1.0	250				
1N2585	S			G	900	1.2	12	1.0	250				
1N2586	S			G	1000	1.2	12	1.0	250				
1N2587	S			G	50	1.0	12	0.2	250				
1N2588	S			G	100	1.0	12	0.2	250				
1N2589	S			G	200	1.0	12	0.2	250				
1N2590	S			G	300	1.0	12	0.2	250				
1N2591	S			G	400	1.0	12	0.2	250				
1N2592	S			G	500	1.0	12	0.2	250				
1N2593	S			G	600	1.0	12	0.2	250				
1N2594	S			G	700	1.0	12	0.2	250				
1N2595	S			G	800	1.0	12	0.2	250				
1N2596	S			G	900	1.0	12	0.2	250				
1N2597	S			G	1000	1.0	12	0.2	250				
1N2598	S			G	50	1.5	12	2.0	250				
1N2599	S			G	100	1.5	12	2.0	250				
1N2600	S			G	200	1.5	12	2.0	250				
1N2601	S			G	300	1.5	12	2.0	250				
1N2602	S			G	400	1.5	12	2.0	250				
1N2603	S			G	500	1.5	12	2.0	250				
1N2604	S			G	600	1.5	12	2.0	250				
1N2605	S			G	700	1.5	12	2.0	250				
1N2606	S			G	800	1.5	12	2.0	250				
1N2607	S			G	900	1.5	12	2.0	250				
1N2608	S			G	1000	1.5	12	2.0	250				
★1N2609	S	1N4001	1N4001	G	50	1.1	0.75	0.3	30				
★1N2610	S	1N4002	1N4001	G	100	1.1	0.75	0.3	30				
★1N2611	S	1N4003	1N4001	G	200	1.1	0.75	0.3	30				
★1N2612	S	1N4004	1N4001	G	300	1.1	0.75	0.3	30				
★1N2613	S	1N4004	1N4001	G	400	1.1	0.75	0.3	30				
★1N2614	S	1N4005	1N4001	G	500	1.1	0.75	0.3	30				
★1N2615	S	1N4005	1N4001	G	600	1.1	0.75	0.3	30				
★1N2616	S	1N4006	1N4001	G	800	1.1	0.75	0.3	30				
★1N2617	S	1N4007	1N4001	G	1000	1.1	0.75	0.3	30				
1N2618	S			G	1200	1.1	0.75	0.3	30				
1N2619	S			G	1500	1.1	0.75	0.3	30				
★1N2620	S		1N2620	R						9.7	0.01	10	0/75
★1N2620A	S		1N2620	R						9.7	0.01	10	-55/100
★1N2620B	S		1N2620	R						9.7	0.01	10	-55/150
★1N2621	S		1N2620	R						9.7	0.005	10	0/75
★1N2621A	S		1N2620	R						9.7	0.005	10	-55/100
★1N2621B	S		1N2620	R						9.7	0.005	10	-55/150
★1N2622	S		1N2620	R						9.7	0.002	10	0/75
★1N2622A	S		1N2620	R						9.7	0.002	10	-55/100
★1N2622B	S		1N2620	R						9.7	0.002	10	-55/150
★1N2623	S		1N2620	R						9.7	0.001	10	0/75
★1N2623A	S		1N2620	R						9.7	0.001	10	-55/100
★1N2623B	S		1N2620	R						9.7	0.001	10	-55/150
★1N2624	S		1N2620	R						9.7	0.0005	10	0/75
★1N2624A	S		1N2620	R						9.7	0.0005	10	-55/100
★1N2624B	S		1N2620	R						9.7	0.0005	10	-55/150
1N2625	S	1N937	1N935	R						9.7	0.0002	10	0/75
1N2625A	S	1N937A	1N935	R						9.4	0.0002	10	-55/100
1N2625B	S	1N937B	1N935	R						9.4	0.0002	10	-55/150
1N2626	S	1N938	1N935	R						9.4	0.0001	10	0/75
1N2626A	S	1N938A	1N935	R						9.4	0.0001	10	-55/100
1N2626B	S	1N938B	1N935	R						9.4	0.0001	10	-55/150
1N2627			Table 3	V									
1N2628			Table 3	V									
1N2629	G			S	5.0								
1N2630	S			G	1500	2.25	0.085	0.5	5.0				
1N2631	S			G	1600	3.0	0.6	0.5	5.0				
1N2632	S			G	2800	6.0	0.2	0.5	5.0				
1N2633	S			G	1600	3.0	0.6	0.5	5.0				
1N2634	S			G	1600	3.0	0.6	0.5	5.0				
1N2635	S			G	1500	2.25	0.085	0.5	5.0				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2636	S			G	1500	2.25	0.085	0.5	5.0				
1N2637	S			G		28.0	0.25	0.5	5.0				
1N2638	S			G	100	1.3	1.5	0.3	15				
1N2641	S			G	200	1.3	1.5	0.3	15				
1N2644	S			G	300	1.3	1.5	0.3	15				
1N2647	S			G	400	1.3	1.5	0.3	15				
1N2650	S			G	600	2.6	1.5	0.3	15				
1N2653	S			G	800	2.6	1.5	0.3	15				
1N2656	S			G	1200	3.9	1.5	0.8	15				
1N2659	S			G	1600	5.2	1.5	0.8	15				
1N2662	S			G	2000	6.5	1.5	0.8	15				
1N2664	S			G	2400	7.8	1.5	0.8	15				
1N2666	S			G	3200	10.4	1.5	0.8	15				
1N2667	S			G	4000	13	1.5	0.8	15				
1N2668	S			G	4800	15.6	1.5	0.8	15				
1N2669	S			G	100	1.3	3.6	0.3	15				
1N2673	S			G	200	1.3	3.6	0.3	15				
1N2677	S			G	300	1.3	3.6	0.3	15				
1N2681	S			G	400	1.3	3.6	0.3	15				
1N2685	S			G	600	2.6	3.6	0.3	15				
1N2687	S			G	800	2.6	3.6	0.3	15				
1N2689	S			G	900	3.9	3.6	0.8	15				
1N2690	S			G	1200	3.9	3.6	0.8	15				
1N2691	S			G	1600	5.2	3.6	0.8	15				
1N2692	S			G	100	1.3	7.2	0.3	15				
1N2694	S			G	200	1.3	7.2	0.3	15				
1N2696	S			G	300	1.3	7.2	0.3	15				
1N2698	S			G	400	1.3	7.2	0.3	15				
1N2700	S			G	600	2.6	7.2	0.3	15				
1N2701	S			G	800	2.6	7.2	0.3	15				
1N2702	S			G	100	1.3	3.0	0.2	15				
1N2705	S			G	200	1.3	3.0	0.2	15				
1N2708	S			G	300	1.3	3.0	0.2	15				
1N2711	S			G	400	1.3	3.0	0.2	15				
1N2714	S			G	600	2.6	3.0	0.2	15				
1N2717	S			G	800	2.6	3.0	0.2	15				
1N2720	S			G	1200	3.9	3.0	0.8	15				
1N2722	S			G	1600	5.2	3.0	0.8	15				
1N2723	S			G	2000	6.5	3.0	0.8	15				
1N2724	S			G	2400	7.8	3.0	0.8	15				
1N2725	S			G	100	1.3	3.0	0.3	15				
1N2728	S			G	200	1.3	3.0	0.3	15				
1N2731	S			G	300	1.3	3.0	0.3	15				
1N2734	S			G	400	1.3	3.0	0.3	15				
1N2737	S			G	600	2.6	3.0	0.3	15				
1N2738	S			G	800	2.6	3.0	0.3	15				
1N2739	S			G	1200	3.9	3.0	0.8	15				
1N2740	S			G	100	1.3	3.6	0.3	15				
1N2742	S			G	200	1.3	3.6	0.3	15				
1N2744	S			G	300	1.3	3.6	0.3	15				
1N2746	S			G	400	1.3	3.6	0.3	15				
1N2748	S			G	600	2.6	3.6	0.3	15				
1N2749	S			G	800	2.6	3.6	0.3	15				
1N2750	S			G	100	1.3	3.0	0.3	15				
1N2753	S			G	200	1.3	3.0	0.3	15				
1N2756	S			G	300	1.3	3.0	0.3	15				
1N2759	S			G	400	1.3	3.0	0.3	15				
1N2762	S			G	600	2.6	3.0	0.3	15				
1N2763	S			G	800	2.6	3.0	0.3	15				
1N2764	S			G	1200	3.9	3.0	0.8	15				
1N2765	S	1N823A	1N821	R						6.8	0.005	7.5	-55/100
1N2765A	S	1N825A	1N821	R						6.8	0.0025	7.5	-55/100
1N2766	S	1N1736A	1N429	R						13.6	0.005	7.5	-55/100
1N2766A	S	1N1736A	1N429	R						13.6	0.0025	7.5	-55/100
1N2767	S	1N4061	1N429	R						20.4	0.005	7.5	-55/100
1N2767A	S	1N4061A	1N429	R						20.4	0.0025	7.5	-55/100
1N2768	S	1N4063	1N429	R						27.2	0.005	7.5	-55/100
1N2768A	S	1N4063A	1N429	R						27.2	0.0025	7.5	-55/100
1N2769	S	1N4065	1N429	R						34.0	0.005	7.5	-55/100
1N2769A	S	1N4065A	1N429	R						34.0	0.0025	7.5	-55/100

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2770	S	1N4067	1N429	R						40.8	0.005	7.5	-55/100
1N2770A	S	1N4067A	1N429	R						40.8	0.0025	7.5	-55/100
1N2772	S			G	700	1.8	0.5		15				
1N2773	S			G	800	1.8	0.5		15				
1N2774	S			G	900	1.8	0.5		15				
1N2775	S			G	1000	1.8	0.5		15				
1N2776	S			G	1100	1.8	0.5		15				
1N2777	S			G	1200	1.8	0.5		15				
1N2778	S			G	1300	1.8	0.5		15				
1N2779	S			G	1400	1.8	0.5		15				
1N2780	S			G	1500	1.8	0.5		15				
1N2781	S			G	1600	1.8	0.5		15				
1N2782	S			S	5.0			2.0*					
1N2783	S	1N3000A	1N2970	Z						62		10	6.0W
1N2784	S			G	200	1.5	8.0	5.0	200				
1N2785	S			G	400	1.5	8.0	5.0	200				
1N2786	S			G	200	1.2	10	10.0	180				
1N2787	S			G	400	1.2	10	10.0	180				
1N2788	S			G	200	1.3	12.5	5.0	340				
1N2789	S			G	400	1.3	12.5	5.0	340				
1N2790	S	1N3156	1N3154	R						8.5	0.002	10	-55/100
1N2791	S			S		1.3	50m	0.05*	4.0				
1N2793	S	1N1183	1N1183	G	50	1.25	5.0	5.0	75				
1N2794	S	1N1184	1N1183	G	100	1.25	5.0	5.0	75				
1N2795	S	1N1185	1N1183	G	150	1.25	5.0	5.0	75				
1N2796	S	1N1186	1N1183	G	200	1.25	5.0	5.0	75				
1N2797	S	1N1187	1N1183	G	250	1.25	5.0	5.0	75				
1N2798	S	1N1187	1N1183	G	300	1.25	5.0	5.0	75				
1N2799	S	1N1188	1N1183	G	350	1.25	5.0	5.0	75				
1N2800	S	1N1188	1N1183	G	400	1.25	5.0	5.0	75				
1N2801	G			S	20	0.36	5.0m	2.0*	500				
1N2802	S		Table 4	M									
1N2803	S			G	400	1.2	250	36	3500				
★1N2804	S		1N2804	Z						6.8	1850	20	50W
★1N2804A	S		1N2804	Z						6.8	1850	10	50W
★1N2804B	S		1N2804	Z						6.8	1850	5.0	50W
★1N2805	S		1N2804	Z						7.5	1700	20	50W
★1N2805A	S		1N2804	Z						7.5	1700	10	50W
★1N2805B	S		1N2804	Z						7.5	1700	5.0	50W
★1N2806	S		1N2804	Z						8.2	1500	20	50W
★1N2806A	S		1N2804	Z						8.2	1500	10	50W
★1N2806B	S		1N2804	Z						8.2	1500	5.0	50W
★1N2807	S		1N2804	Z						9.1	1370	20	50W
★1N2807A	S		1N2804	Z						9.1	1370	10	50W
★1N2807B	S		1N2804	Z						9.1	1370	5.0	50W
★1N2808	S		1N2804	Z						10	1200	20	50W
★1N2808A	S		1N2804	Z						10	1200	10	50W
★1N2808B	S		1N2804	Z						10	1200	5.0	50W
★1N2809	S		1N2804	Z						11	1100	20	50W
★1N2809A	S		1N2804	Z						11	1100	10	50W
★1N2809B	S		1N2804	Z						11	1100	5.0	50W
★1N2810	S		1N2804	Z						12	1000	20	50W
★1N2810A	S		1N2804	Z						12	1000	10	50W
★1N2810B	S		1N2804	Z						12	1000	5.0	50W
★1N2811	S		1N2804	Z						13	960	20	50W
★1N2811A	S		1N2804	Z						13	960	10	50W
★1N2811B	S		1N2804	Z						13	960	5.0	50W
★1N2812	S		1N2804	Z						14	890	20	50W
★1N2812A	S		1N2804	Z						14	890	10	50W
★1N2812B	S		1N2804	Z						14	890	5.0	50W
★1N2813	S		1N2804	Z						15	830	20	50W
★1N2813A	S		1N2804	Z						15	830	10	50W
★1N2813B	S		1N2804	Z						15	830	5.0	50W
★1N2814	S		1N2804	Z						16	780	20	50W
★1N2814A	S		1N2804	Z						16	780	10	50W
★1N2814B	S		1N2804	Z						16	780	5.0	50W
★1N2815	S		1N2804	Z						17	740	20	50W
★1N2815A	S		1N2804	Z						17	740	10	50W
★1N2815B	S		1N2804	Z						17	740	5.0	50W
★1N2816	S		1N2804	Z						18	700	20	50W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N2816A	S		1N2804	Z						18	700	10	50W
★1N2816B	S		1N2804	Z						18	700	5.0	50W
★1N2817	S		1N2804	Z						19	660	20	50W
★1N2817A	S		1N2804	Z						19	660	10	50W
★1N2817B	S		1N2804	Z						19	660	5.0	50W
★1N2818	S		1N2804	Z						20	630	20	50W
★1N2818A	S		1N2804	Z						20	630	10	50W
★1N2818B	S		1N2804	Z						20	630	5.0	50W
★1N2819	S		1N2804	Z						22	570	20	50W
★1N2819A	S		1N2804	Z						22	570	10	50W
★1N2819B	S		1N2804	Z						22	570	5.0	50W
★1N2820	S		1N2804	Z						24	520	20	50W
★1N2820A	S		1N2804	Z						24	520	10	50W
★1N2820B	S		1N2804	Z						24	520	5.0	50W
★1N2821	S		1N2804	Z						25	500	20	50W
★1N2821A	S		1N2804	Z						25	500	10	50W
★1N2821B	S		1N2804	Z						25	500	5.0	50W
★1N2822	S		1N2804	Z						27	460	20	50W
★1N2822A	S		1N2804	Z						27	460	10	50W
★1N2822B	S		1N2804	Z						27	460	5.0	50W
★1N2823	S		1N2804	Z						30	420	20	50W
★1N2823A	S		1N2804	Z						30	420	10	50W
★1N2823B	S		1N2804	Z						30	420	5.0	50W
★1N2824	S		1N2804	Z						33	380	20	50W
★1N2824A	S		1N2804	Z						33	380	10	50W
★1N2824B	S		1N2804	Z						33	380	5.0	50W
★1N2825	S		1N2804	Z						36	350	20	50W
★1N2825A	S		1N2804	Z						36	350	10	50W
★1N2825B	S		1N2804	Z						36	350	5.0	50W
★1N2826	S		1N2804	Z						39	320	20	50W
★1N2826A	S		1N2804	Z						39	320	10	50W
★1N2826B	S		1N2804	Z						39	320	5.0	50W
★1N2827	S		1N2804	Z						43	290	20	50W
★1N2827A	S		1N2804	Z						43	290	10	50W
★1N2827B	S		1N2804	Z						43	290	5.0	50W
★1N2828	S		1N2804	Z						45	280	20	50W
★1N2828A	S		1N2804	Z						45	280	10	50W
★1N2828B	S		1N2804	Z						45	280	5.0	50W
★1N2829	S		1N2804	Z						47	270	20	50W
★1N2829A	S		1N2804	Z						47	270	10	50W
★1N2829B	S		1N2804	Z						47	270	5.0	50W
★1N2830	S		1N2804	Z						50	250	20	50W
★1N2830A	S		1N2804	Z						50	250	10	50W
★1N2830B	S		1N2804	Z						50	250	5.0	50W
★1N2831	S		1N2804	Z						51	245	20	50W
★1N2831A	S		1N2804	Z						51	245	10	50W
★1N2831B	S		1N2804	Z						51	245	5.0	50W
★1N2832	S		1N2804	Z						56	220	20	50W
★1N2832A	S		1N2804	Z						56	220	10	50W
★1N2832B	S		1N2804	Z						56	220	5.0	50W
★1N2833	S		1N2804	Z						62	200	20	50W
★1N2833A	S		1N2804	Z						62	200	10	50W
★1N2833B	S		1N2804	Z						62	200	5.0	50W
★1N2834	S		1N2804	Z						68	180	20	50W
★1N2834A	S		1N2804	Z						68	180	10	50W
★1N2834B	S		1N2804	Z						68	180	5.0	50W
★1N2835	S		1N2804	Z						75	170	20	50W
★1N2835A	S		1N2804	Z						75	170	10	50W
★1N2835B	S		1N2804	Z						75	170	5.0	50W
★1N2836	S		1N2804	Z						82	150	20	50W
★1N2836A	S		1N2804	Z						82	150	10	50W
★1N2836B	S		1N2804	Z						82	150	5.0	50W
★1N2837	S		1N2804	Z						91	140	20	50W
★1N2837A	S		1N2804	Z						91	140	10	50W
★1N2837B	S		1N2804	Z						91	140	5.0	50W
★1N2838	S		1N2804	Z						100	120	20	50W
★1N2838A	S		1N2804	Z						100	120	10	50W
★1N2838B	S		1N2804	Z						100	120	5.0	50W
★1N2839	S		1N2804	Z						105	120	20	50W
★1N2839A	S		1N2804	Z						105	120	10	50W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_0 Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N2839B	S		1N2804	Z						105	120	5.0	50W
★1N2840	S		1N2804	Z						110	110	20	50W
★1N2840A	S		1N2804	Z						110	110	10	50W
★1N2840B	S		1N2804	Z						110	110	5.0	50W
★1N2841	S		1N2804	Z						120	100	20	50W
★1N2841A	S		1N2804	Z						120	100	10	50W
★1N2841B	S		1N2804	Z						120	100	5.0	50W
★1N2842	S		1N2804	Z						130	95	20	50W
★1N2842A	S		1N2804	Z						130	95	10	50W
★1N2842B	S		1N2804	Z						130	95	5.0	50W
★1N2843	S		1N2804	Z						140	90	20	50W
★1N2843A	S		1N2804	Z						140	90	10	50W
★1N2843B	S		1N2804	Z						140	90	5.0	50W
★1N2844	S		1N2804	Z						160	80	20	50W
★1N2844A	S		1N2804	Z						160	80	10	50W
★1N2844B	S		1N2804	Z						160	80	5.0	50W
★1N2845	S		1N2804	Z						180	68	20	50W
★1N2845A	S		1N2804	Z						180	68	10	50W
★1N2845B	S		1N2804	Z						180	68	5.0	50W
★1N2846	S		1N2804	Z						200	65	20	50W
★1N2846A	S		1N2804	Z						200	65	10	50W
★1N2846B	S		1N2804	Z						200	65	5.0	50W
1N2847	S			G	100	2.0	1.5	0.3	15				
1N2848	S			G	200	2.0	1.5	0.2	15				
1N2849	S			G	300	2.0	1.5	0.2	15				
1N2850	S			G	400	2.0	1.5	0.2	15				
1N2851	S			G	500	2.0	1.5	0.2	15				
1N2852	S			G	600	2.0	1.5	0.2	15				
1N2855	S			G	600	1.2	250	25	3500				
1N2856	S			G	800	1.2	250	20	4500				
1N2857	S			G	1000	1.2	250	15	4500				
1N2858	S	1N4001	1N4001	G	50	1.2	0.75	0.3	40				
1N2858A	S			G	50	1.2	1.0	0.3	25				
1N2859	S	1N4002	1N4001	G	100	1.2	0.75	0.3	40				
1N2859A	S			G	100	1.2	1.0	0.3	25				
1N2860	S	1N4003	1N4001	G	200	1.2	0.75	0.3	40				
1N2860A	S			G	200	1.2	1.0	0.3	25				
1N2861	S	1N4004	1N4001	G	300	1.2	0.75	0.2	40				
1N2861A	S			G	300	1.2	1.0	0.3	25				
1N2862	S	1N4004	1N4001	G	400	1.2	0.75	0.2	40				
1N2862A	S			G	400	1.2	1.0	0.3	25				
1N2863	S	1N4005	1N4001	G	500	1.2	0.75	0.2	40				
1N2863A	S			G	500	1.2	1.0	0.3	25				
1N2864	S	1N4005	1N4001	G	600	1.2	0.75	0.2	40				
1N2864A	S			G	600	1.2	1.0	0.3	25				
1N2865	S			G	1000	2.5	0.7	0.1	7.0				
1N2866	S			G	1500	2.5	0.7	0.1	7.0				
1N2867	S			G	1000	2.5	0.7	0.1	7.0				
1N2868	S			G	1500	2.5	0.7	0.1	7.0				
1N2878	S	1N4006	1N4001	S	700	2.0	250m	0.5*					
1N2879	S	1N4006	1N4001	S	700	2.0	250m	0.5*					
1N2880	S	1N4007	1N4001	S	1.0k	2.0	250m	0.5*					
1N2881	S	1N4007	1N4001	S	1.0k	2.0	250m	0.5*					
1N2882	S	1N4007	1N4001	S	500	3.0	250m	0.5*					
1N2883	S	1N4007	1N4001	S	500	3.0	250m	0.5*					
1N2884	S	MR991A	MR990A	S	400	4.0	250m	0.5*					
1N2885	S	MR991A	MR990A	S	400	4.0	250m	0.5*					
1N2886	S	MR991A	MR990A	S	500	3.0	250m	0.5*					
1N2887	S	MR991A	MR990A	S	500	3.0	250m	0.5*					
1N2888	S			S	750	5.0	250m	0.5*					
1N2889	S	MR992A	MR990A	S	750	5.0	250m	0.5*					
1N2890	S	MR992A	MR990A	S	2.0k	4.0	250m	0.5*					
1N2891	S	MR992A	MR990A	S	2.0k	4.0	250m	0.5*					
1N2892	S	MR993A	MR990A	S	100	6.0	250m	0.5*					
1N2893	S	MR993A	MR990A	S	100	6.0	250m	0.5*					
1N2894	S	MR994A	MR990A	S	450	7.0	250m	0.5*					
1N2895	S	MR994A	MR990A	S	450	7.0	250m	0.5*					
1N2896	S	MR994A	MR990A	S	500	5.0	250m	0.5*					
1N2897	S	MR994A	MR990A	S	500	5.0	250m	0.5*					
1N2898	S	MR995A	MR990A	S	800	8.0	250m	0.5*					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N2899	S	MR995A	MR990A	S	800	8.0	250m	0.5*					
1N2900	S	MR995A	MR990A	S	3.0k	6.0	250m	0.5*					
1N2901	S	MR995A	MR990A	S	3.0k	6.0	250m	0.5*					
1N2902	S			S	150	9.0	250m	0.5*					
1N2903	S			S	150	9.0	250m	0.5*					
1N2904	S			S	500	7.0	250m	0.5*					
1N2905	S			S	500	7.0	250m	0.5*					
1N2906	S			S	500	10	250m	0.5*					
1N2907	S			S	500	10	250m	0.5*					
1N2908	S			S	850	11	250m	0.5*					
1N2909	S			S	850	11	250m	0.5*					
1N2910	S			S	4.0k	8.0	250m	0.5*					
1N2911	S			S	4.0k	8.0	250m	0.5*					
1N2912	S			S	200	12	250m	0.5*					
1N2913	S			S	200	12	250m	0.5*					
1N2914	S			S	500	9.0	250m	0.5*					
1N2915	S			S	500	9.0	250m	0.5*					
1N2916	S			S	550	13	250m	0.5*					
1N2917	S			S	550	13	250m	0.5*					
1N2918	S			S	5.0k	10	250m	0.5*					
1N2919	S			S	5.0k	10	250m	0.5*					
1N2920	S			S	500	11	250m	0.5*					
1N2921	S			S	500	11	250m	0.5*					
1N2922	S			S	6.0k	12	250m	0.5*					
1N2923	S			S	6.0k	12	250m	0.5*					
1N2924	S			S	500	13	250m	0.5*					
1N2925	S			S	500	13	250m	0.5*					
1N2926			Table 4	M									
1N2926A			Table 4	M									
1N2927,A				T									
thru	S			T									
1N2934,A				T									
1N2937	S	1N2996A	1N2970	Z						45	25	5.0	10W
1N2938	S			Z						0.9	100	15	2.0W
1N2939,A				T									
thru	G			T									
1N2941,A													
1N2969	G			T									
1N2969A	G			T									
★1N2970	S		1N2970	Z						6.8	370	20	10W
★1N2970A	S		1N2970	Z						6.8	370	10	10W
★1N2970B	S		1N2970	Z						6.8	370	5.0	10W
★1N2971	S		1N2970	Z						7.5	335	20	10W
★1N2971A	S		1N2970	Z						7.5	335	10	10W
★1N2971B	S		1N2970	Z						7.5	335	5.0	10W
★1N2972	S		1N2970	Z						8.2	305	20	10W
★1N2972A	S		1N2970	Z						8.2	305	10	10W
★1N2972B	S		1N2970	Z						8.2	305	5.0	10W
★1N2973	S		1N2970	Z						9.1	275	20	10W
★1N2973A	S		1N2970	Z						9.1	275	10	10W
★1N2973B	S		1N2970	Z						9.1	275	5.0	10W
★1N2974	S		1N2970	Z						10	250	20	10W
★1N2974A	S		1N2970	Z						10	250	10	10W
★1N2974B	S		1N2970	Z						10	250	5.0	10W
★1N2975	S		1N2970	Z						11	230	20	10W
★1N2975A	S		1N2970	Z						11	230	10	10W
★1N2975B	S		1N2970	Z						11	230	5.0	10W
★1N2976	S		1N2970	Z						12	210	20	10W
★1N2976A	S		1N2970	Z						12	210	10	10W
★1N2976B	S		1N2970	Z						12	210	5.0	10W
★1N2977	S		1N2970	Z						13	190	20	10W
★1N2977A	S		1N2970	Z						13	190	10	10W
★1N2977B	S		1N2970	Z						13	190	5.0	10W
★1N2978	S		1N2970	Z						14	180	20	10W
★1N2978A	S		1N2970	Z						14	180	10	10W
★1N2978B	S		1N2970	Z						14	180	5.0	10W
★1N2979	S		1N2970	Z						15	170	20	10W
★1N2979A	S		1N2970	Z						15	170	10	10W
★1N2979B	S		1N2970	Z						15	170	5.0	10W
★1N2980	S		1N2970	Z						16	155	20	10W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N2980A	S		1N2970	Z						16	155	10	10W
★1N2980B	S		1N2970	Z						16	155	5.0	10W
★1N2981	S		1N2970	Z						17	145	20	10W
★1N2981A	S		1N2970	Z						17	145	10	10W
★1N2981B	S		1N2970	Z						17	145	5.0	10W
★1N2982	S		1N2970	Z						18	140	20	10W
★1N2982A	S		1N2970	Z						18	140	10	10W
★1N2982B	S		1N2970	Z						18	140	5.0	10W
★1N2983	S		1N2970	Z						19	130	20	10W
★1N2983A	S		1N2970	Z						19	130	10	10W
★1N2983B	S		1N2970	Z						19	130	5.0	10W
★1N2984	S		1N2970	Z						20	125	20	10W
★1N2984A	S		1N2970	Z						20	125	10	10W
★1N2984B	S		1N2970	Z						20	125	5.0	10W
★1N2985	S		1N2970	Z						22	115	20	10W
★1N2985A	S		1N2970	Z						22	115	10	10W
★1N2985B	S		1N2970	Z						22	115	5.0	10W
★1N2986	S		1N2970	Z						24	105	20	10W
★1N2986A	S		1N2970	Z						24	105	10	10W
★1N2986B	S		1N2970	Z						24	105	5.0	10W
★1N2987	S		1N2970	Z						25	100	20	10W
★1N2987A	S		1N2970	Z						25	100	10	10W
★1N2987B	S		1N2970	Z						25	100	5.0	10W
★1N2988	S		1N2970	Z						27	95	20	10W
★1N2988A	S		1N2970	Z						27	95	10	10W
★1N2988B	S		1N2970	Z						27	95	5.0	10W
★1N2989	S		1N2970	Z						30	85	20	10W
★1N2989A	S		1N2970	Z						30	85	10	10W
★1N2989B	S		1N2970	Z						30	85	5.0	10W
★1N2990	S		1N2970	Z						33	75	20	10W
★1N2990A	S		1N2970	Z						33	75	10	10W
★1N2990B	S		1N2970	Z						33	75	5.0	10W
★1N2991	S		1N2970	Z						36	70	20	10W
★1N2991A	S		1N2970	Z						36	70	10	10W
★1N2991B	S		1N2970	Z						36	70	5.0	10W
★1N2992	S		1N2970	Z						39	65	20	10W
★1N2992A	S		1N2970	Z						39	65	10	10W
★1N2992B	S		1N2970	Z						39	65	5.0	10W
★1N2993	S		1N2970	Z						43	60	20	10W
★1N2993A	S		1N2970	Z						43	60	10	10W
★1N2993B	S		1N2970	Z						43	60	5.0	10W
★1N2994	S		1N2970	Z						45	55	20	10W
★1N2994A	S		1N2970	Z						45	55	10	10W
★1N2994B	S		1N2970	Z						45	55	5.0	10W
★1N2995	S		1N2970	Z						47	55	20	10W
★1N2995A	S		1N2970	Z						47	55	10	10W
★1N2995B	S		1N2970	Z						47	55	5.0	10W
★1N2996	S		1N2970	Z						50	50	20	10W
★1N2996A	S		1N2970	Z						50	50	10	10W
★1N2996B	S		1N2970	Z						50	50	5.0	10W
★1N2997	S		1N2970	Z						51	50	20	10W
★1N2997A	S		1N2970	Z						51	50	10	10W
★1N2997B	S		1N2970	Z						51	50	5.0	10W
★1N2998	S		1N2970	Z						52	50	20	10W
★1N2998A	S		1N2970	Z						52	50	10	10W
★1N2998B	S		1N2970	Z						52	50	5.0	10W
★1N2999	S		1N2970	Z						56	45	20	10W
★1N2999A	S		1N2970	Z						56	45	10	10W
★1N2999B	S		1N2970	Z						56	45	5.0	10W
★1N3000	S		1N2970	Z						62	40	20	10W
★1N3000A	S		1N2970	Z						62	40	10	10W
★1N3000B	S		1N2970	Z						62	40	5.0	10W
★1N3001	S		1N2970	Z						68	37	20	10W
★1N3001A	S		1N2970	Z						68	37	10	10W
★1N3001B	S		1N2970	Z						68	37	5.0	10W
★1N3002	S		1N2970	Z						75	33	20	10W
★1N3002A	S		1N2970	Z						75	33	10	10W
★1N3002B	S		1N2970	Z						75	33	5.0	10W
★1N3003	S		1N2970	Z						82	30	20	10W
★1N3003A	S		1N2970	Z						82	30	10	10W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3003B	S		1N2970	Z						82	30	5.0	10W
★1N3004	S		1N2970	Z						91	28	20	10W
★1N3004A	S		1N2970	Z						91	28	10	10W
★1N3004B	S		1N2970	Z						91	28	5.0	10W
★1N3005	S		1N2970	Z						100	25	20	10W
★1N3005A	S		1N2970	Z						100	25	10	10W
★1N3005B	S		1N2970	Z						100	25	5.0	10W
★1N3006	S		1N2970	Z						105	25	20	10W
★1N3006A	S		1N2970	Z						105	25	10	10W
★1N3006B	S		1N2970	Z						105	25	5.0	10W
★1N3007	S		1N2970	Z						110	23	20	10W
★1N3007A	S		1N2970	Z						110	23	10	10W
★1N3007B	S		1N2970	Z						110	23	5.0	10W
★1N3008	S		1N2970	Z						120	20	20	10W
★1N3008A	S		1N2970	Z						120	20	10	10W
★1N3008B	S		1N2970	Z						120	20	5.0	10W
★1N3009	S		1N2970	Z						130	19	20	10W
★1N3009A	S		1N2970	Z						130	19	10	10W
★1N3009B	S		1N2970	Z						130	19	5.0	10W
★1N3010	S		1N2970	Z						140	18	20	10W
★1N3010A	S		1N2970	Z						140	18	10	10W
★1N3010B	S		1N2970	Z						140	18	5.0	10W
★1N3011	S		1N2970	Z						150	17	20	10W
★1N3011A	S		1N2970	Z						150	17	10	10W
★1N3011B	S		1N2970	Z						150	17	5.0	10W
★1N3012	S		1N2970	Z						160	16	20	10W
★1N3012A	S		1N2970	Z						160	16	10	10W
★1N3012B	S		1N2970	Z						160	16	5.0	10W
★1N3013	S		1N2970	Z						175	14	20	10W
★1N3013A	S		1N2970	Z						175	14	10	10W
★1N3013B	S		1N2970	Z						175	14	5.0	10W
★1N3014	S		1N2970	Z						180	14	20	10W
★1N3014A	S		1N2970	Z						180	14	10	10W
★1N3014B	S		1N2970	Z						180	14	5.0	10W
★1N3015	S		1N2970	Z						200	12	20	10W
★1N3015A	S		1N2970	Z						200	12	10	10W
★1N3015B	S		1N2970	Z						200	12	5.0	10W
★1N3016	S		1N3821	Z						6.8	37	20	1.0W
★1N3016A	S		1N3821	Z						6.8	37	10	1.0W
★1N3016B	S		1N3821	Z						6.8	37	5.0	1.0W
★1N3017	S		1N3821	Z						7.5	34	20	1.0W
★1N3017A	S		1N3821	Z						7.5	34	10	1.0W
★1N3017B	S		1N3821	Z						7.5	34	5.0	1.0W
★1N3018	S		1N3821	Z						8.2	31	20	1.0W
★1N3018A	S		1N3821	Z						8.2	31	10	1.0W
★1N3018B	S		1N3821	Z						8.2	31	5.0	1.0W
★1N3019	S		1N3821	Z						9.1	28	20	1.0W
★1N3019A	S		1N3821	Z						9.1	28	10	1.0W
★1N3019B	S		1N3821	Z						9.1	28	5.0	1.0W
★1N3020	S		1N3821	Z						10	25	20	1.0W
★1N3020A	S		1N3821	Z						10	25	10	1.0W
★1N3020B	S		1N3821	Z						10	25	5.0	1.0W
★1N3021	S		1N3821	Z						11	23	20	1.0W
★1N3021A	S		1N3821	Z						11	23	10	1.0W
★1N3021B	S		1N3821	Z						11	23	5.0	1.0W
★1N3022	S		1N3821	Z						12	21	20	1.0W
★1N3022A	S		1N3821	Z						12	21	10	1.0W
★1N3022B	S		1N3821	Z						12	21	5.0	1.0W
★1N3023	S		1N3821	Z						13	19	20	1.0W
★1N3023A	S		1N3821	Z						13	19	10	1.0W
★1N3023B	S		1N3821	Z						13	19	5.0	1.0W
★1N3024	S		1N3821	Z						15	17	20	1.0W
★1N3024A	S		1N3821	Z						15	17	10	1.0W
★1N3024B	S		1N3821	Z						15	17	5.0	1.0W
★1N3025	S		1N3821	Z						16	15.5	20	1.0W
★1N3025A	S		1N3821	Z						16	15.5	10	1.0W
★1N3025B	S		1N3821	Z						16	15.5	5.0	1.0W
★1N3026	S		1N3821	Z						18	14	20	1.0W
★1N3026A	S		1N3821	Z						18	14	10	1.0W
★1N3026B	S		1N3821	Z						18	14	5.0	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3027	S		1N3821	Z						20	12.5	20	1.0W
★1N3027A	S		1N3821	Z						20	12.5	10	1.0W
★1N3027B	S		1N3821	Z						20	12.5	5.0	1.0W
★1N3028	S		1N3821	Z						22	11.5	20	1.0W
★1N3028A	S		1N3821	Z						22	11.5	10	1.0W
★1N3028B	S		1N3821	Z						22	11.5	5.0	1.0W
★1N3029	S		1N3821	Z						24	10.5	20	1.0W
★1N3029A	S		1N3821	Z						24	10.5	10	1.0W
★1N3029B	S		1N3821	Z						24	10.5	5.0	1.0W
★1N3030	S		1N3821	Z						27	9.5	20	1.0W
★1N3030A	S		1N3821	Z						27	9.5	10	1.0W
★1N3030B	S		1N3821	Z						27	9.5	5.0	1.0W
★1N3031	S		1N3821	Z						30	8.5	20	1.0W
★1N3031A	S		1N3821	Z						30	8.5	10	1.0W
★1N3031B	S		1N3821	Z						30	8.5	5.0	1.0W
★1N3032	S		1N3821	Z						33	7.5	20	1.0W
★1N3032A	S		1N3821	Z						33	7.5	10	1.0W
★1N3032B	S		1N3821	Z						33	7.5	5.0	1.0W
★1N3033	S		1N3821	Z						36	7.0	20	1.0W
★1N3033A	S		1N3821	Z						36	7.0	10	1.0W
★1N3033B	S		1N3821	Z						36	7.0	5.0	1.0W
★1N3034	S		1N3821	Z						39	6.5	20	1.0W
★1N3034A	S		1N3821	Z						39	6.5	10	1.0W
★1N3034B	S		1N3821	Z						39	6.5	5.0	1.0W
★1N3035	S		1N3821	Z						43	6.0	20	1.0W
★1N3035A	S		1N3821	Z						43	6.0	10	1.0W
★1N3035B	S		1N3821	Z						43	6.0	5.0	1.0W
★1N3036	S		1N3821	Z						47	5.5	20	1.0W
★1N3036A	S		1N3821	Z						47	5.5	10	1.0W
★1N3036B	S		1N3821	Z						47	5.5	5.0	1.0W
★1N3037	S		1N3821	Z						51	5.0	20	1.0W
★1N3037A	S		1N3821	Z						51	5.0	10	1.0W
★1N3037B	S		1N3821	Z						51	5.0	5.0	1.0W
★1N3038	S		1N3821	Z						56	4.5	20	1.0W
★1N3038A	S		1N3821	Z						56	4.5	10	1.0W
★1N3038B	S		1N3821	Z						56	4.5	5.0	1.0W
★1N3039	S		1N3821	Z						62	4.0	20	1.0W
★1N3039A	S		1N3821	Z						62	4.0	10	1.0W
★1N3039B	S		1N3821	Z						62	4.0	5.0	1.0W
★1N3040	S		1N3821	Z						68	3.7	20	1.0W
★1N3040A	S		1N3821	Z						68	3.7	10	1.0W
★1N3040B	S		1N3821	Z						68	3.7	5.0	1.0W
★1N3041	S		1N3821	Z						75	3.3	20	1.0W
★1N3041A	S		1N3821	Z						75	3.3	10	1.0W
★1N3041B	S		1N3821	Z						75	3.3	5.0	1.0W
★1N3042	S		1N3821	Z						82	3.0	20	1.0W
★1N3042A	S		1N3821	Z						82	3.0	10	1.0W
★1N3042B	S		1N3821	Z						82	3.0	5.0	1.0W
★1N3043	S		1N3821	Z						91	2.8	20	1.0W
★1N3043A	S		1N3821	Z						91	2.8	10	1.0W
★1N3043B	S		1N3821	Z						91	2.8	5.0	1.0W
★1N3044	S		1N3821	Z						100	2.5	20	1.0W
★1N3044A	S		1N3821	Z						100	2.5	10	1.0W
★1N3044B	S		1N3821	Z						100	2.5	5.0	1.0W
★1N3045	S		1N3821	Z						110	2.3	20	1.0W
★1N3045A	S		1N3821	Z						110	2.3	10	1.0W
★1N3045B	S		1N3821	Z						110	2.3	5.0	1.0W
★1N3046	S		1N3821	Z						120	2.0	20	1.0W
★1N3046A	S		1N3821	Z						120	2.0	10	1.0W
★1N3046B	S		1N3821	Z						120	2.0	5.0	1.0W
★1N3047	S		1N3821	Z						130	1.9	20	1.0W
★1N3047A	S		1N3821	Z						130	1.9	10	1.0W
★1N3047B	S		1N3821	Z						130	1.9	5.0	1.0W
★1N3048	S		1N3821	Z						150	1.7	20	1.0W
★1N3048A	S		1N3821	Z						150	1.7	10	1.0W
★1N3048B	S		1N3821	Z						150	1.7	5.0	1.0W
★1N3049	S		1N3821	Z						160	1.6	20	1.0W
★1N3049A	S		1N3821	Z						160	1.6	10	1.0W
★1N3049B	S		1N3821	Z						160	1.6	5.0	1.0W
★1N3050	S		1N3821	Z						180	1.4	20	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3050A	S		1N3821	Z						180	1.4	10	1.0W
★1N3050B	S		1N3821	Z						180	1.4	5.0	1.0W
★1N3051	S		1N3821	Z						200	1.2	20	1.0W
★1N3051A	S		1N3821	Z							1.2	10	1.0W
★1N3051B	S		1N3821	Z							1.2	5.0	1.0W
1N3052	S			G	12k	70	0.1	0.2	6.0				
1N3053	S			G	14k	75	0.1	0.2	6.0				
1N3054	S			G	16k	80	0.1	0.2	6.0				
1N3055	S			G	18k	85	0.1	0.2	6.0				
1N3056	S			G	20k	90	0.1	0.2	6.0				
1N3057	S			G	22k	95	0.1	0.2	6.0				
1N3058	S			G	24k	100	0.1	0.2	6.0				
1N3059	S			G	26k	105	0.1	0.2	6.0				
1N3060	S			G	28k	120	0.1	0.2	6.0				
1N3061	S			G	30k	125	0.1	0.2	6.0				
1N3062	S			S	75	1.0	20m	0.1*	2.0				
1N3063	S			S	75	0.85	10m	0.1*	2.0				
1N3064	S			S	75	1.0	10m	0.1*	4.0				
1N3065	S			S	75	1.0	20m	0.1*	2.0				
1N3066	S			S	75	1.0	10m	0.1*	2.0				
1N3067	S			S	30	1.0	5.0m	0.1*	2.0				
1N3068	S			S	30	1.0	5.0m	0.1*	50				
1N3069	S			S	65	1.0	50m	0.1*	50				
1N3070	S			S	200	1.0	100m	0.1*	50				
1N3071	S			S	200	1.0	100m	0.1*	50				
1N3072	S	1N4001	1N4001	G	50	1.5	0.2	0.5	10				
1N3073	S	1N4002	1N4001	G	100	1.5	0.2	0.5	10				
1N3074	S	1N4003	1N4001	G	150	1.5	0.2	0.5	10				
1N3075	S	1N4003	1N4001	G	200	1.5	0.2	0.5	10				
1N3076	S	1N4004	1N4001	G	250	1.5	0.2	0.5	10				
1N3077	S	1N4004	1N4001	G	300	1.5	0.2	0.5	10				
1N3078	S	1N4004	1N4001	G	350	1.5	0.2	0.5	10				
1N3079	S	1N4004	1N4001	G	400	1.5	0.2	0.5	10				
1N3080	S	1N4005	1N4001	G	500	1.5	0.2	0.5	10				
1N3081	S	1N4005	1N4001	G	600	1.5	0.2	0.5	10				
1N3082	S	1N4003	1N4001	G	200	1.25	0.5	0.2	15				
1N3083	S	1N4004	1N4001	G	400	1.25	0.5	0.2	15				
1N3084	S	1N4005	1N4001	G	600	1.25	0.5	0.2	15				
1N3085	S	MR1121SB	MR1220	G	100	1.1	150	40	1500				
1N3086	S	MR1223SB	MR1220	G	200	1.1	150	40	1500				
1N3087	S	MR1225SB	MR1200	G	300	1.1	150	40	1500				
1N3088	S	MR1227SB	MR1200	G	400	1.1	150	40	1500				
1N3089	S	MR1228SB	MR1200	G	500	1.1	150	40	1500				
1N3090	S	MR1229SB	MR1220	G	600	1.1	150	40	1500				
1N3091	S			G	800	1.1	150	40	1500				
1N3092	S			G	1000	1.1	150	40	1500				
1N3093	G		Table 4	M									
1N3097	G		1N3016	S	30	0.5	10m	4.0*	0.5				
1N3098,A	S	1N3046A		Z						120	3.0	20/10	1.0W
1N3099,A	S	1N3048A		Z						150	3.0	20/10	1.0W
1N3100,A	S	1N3050A		Z						180	3.0	20/10	1.0W
1N3101,A	S	1N3051A		Z						220	3.0	20/10	1.0W
1N3102,A	S	1N3008A	1N2970	Z						120	3.0	20/10	10W
1N3103,A	S	1N3011A	1N2970	Z						150	3.0		10W
1N3104,A	S	1N3014A	1N2970	Z						180	3.0		10W
1N3105,A	S	1N3015A	1N2970	Z						220	3.0		10W
1N3106	S			G	800	1.6	0.75	0.3	30				
1N3107	S			G	1200	3.2	0.5	0.3	15				
1N3108	S			G	800	1.6	1.5	0.3	30				
1N3109	S			G	1200	3.2	0.7	0.3	15				
1N3110	G			S	8.0	0.45	5.0m	20*					
1N3111	S	MR1220SB	MR1220	G	50	1.1	150	40	1500				
1N3112	S	1N4737A	1N4728	Z						7.4	120	5.0	1.0W
1N3113				T									
thru	A			T									
1N3120				T									
1N3121	G			S	50	0.25	0.1m	3.5*	0.5				
1N3122	G			S	20	0.3	1.0m	4.5*					
1N3123	S			S	40	1.5	10m	0.1*	4.0				
1N3124	S			S	40	1.0	20m	0.1*	4.0				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3125	G			S	40	0.4	5.0m	100*	0.3				
1N3128				T									
thru	G			T									
1N3130				T									
1N3138	A			T									
1N3139	S			G	50	1.55	70	15	1200				
1N3140	S			G	100	1.55	70	15	1200				
1N3141	S			G	150	1.55	70	15	1200				
1N3142	S			G	200	1.55	70	15	1200				
1N3143	G		Table 4	M									
1N3144	G			S	20	0.3	1.0m	20*	0.5				
1N3145	G			S	65	0.45	10m	25*					
1N3146	G			S	20	1.0	50m	100*	2.0				
1N3147	S			S	45	1.0	100m		1.0				
1N3148	S	1N3155A	1N3154	R						8.5	0.005	10	-55/100
1N3149	G			T									
1N3149A	G			T									
1N3150	G			T									
1N3151	S			G	7200	27	0.1	250	12				
★1N3154	S		1N3154	R						8.8	0.01	10	-55/100
★1N3154A	S		1N3154	R						8.8	0.01	10	-55/100
★1N3155	S		1N3154	R						8.8	0.005	10	-55/100
★1N3155A	S		1N3154	R						8.8	0.005	10	-55/100
★1N3156	S		1N3154	R						8.8	0.002	10	-55/100
★1N3156A	S		1N3154	R						8.8	0.002	10	-55/100
★1N3157	S		1N3154	R						8.8	0.001	10	-55/100
★1N3157A	S		1N3154	R						8.8	0.001	10	-55/100
1N3159	G			S	15	0.45	10m		0.3				
1N3160	G			S	60	1.0	5.0m	12*					
1N3161	S	MR1230SB	MR1230	G	50	1.30	240	16	3000				
1N3162	S	MR1231SB	MR1230	G	100	1.30	240	16	3000				
1N3163	S	MR1232SB	MR1230	G	150	1.30	240	16	3000				
1N3164	S	MR1233SB	MR1230	G	200	1.30	240	16	3000				
1N3165	S	MR1234SB	MR1230	G	250	1.30	240	16	3000				
1N3166	S	MR1235SB	MR1230	G	300	1.30	240	16	3000				
1N3167	S	MR1236SB	MR1230	G	350	1.30	240	16	3000				
1N3168	S	MR1237SB	MR1230	G	400	1.30	240	16	3000				
1N3169	S	MR1238SB	MR1230	G	500	1.30	240	16	3000				
1N3170	S	MR1239SB	MR1230	G	600	1.30	240	16	3000				
1N3171	S			G	700	1.92	240	16	3000				
1N3171A	S			G	700	1.9	240	16	3000				
1N3172	S			G	800	1.92	240	16	3000				
1N3172A	S			G	800	1.9	240	16	3000				
1N3173	S			G	900	1.92	240	16	3000				
1N3173A	S			G	900	1.9	240	16	3000				
1N3174	S			G	1000	1.92	240	16	3000				
1N3174A	S			G	1000	1.9	240	16	3000				
1N3175	S			G	1200	1.4	240	15	3000				
1N3176	S			G	1400	1.4	240	15	3000				
1N3177	S			G	1600	1.4	240	15	3000				
1N3179	S			S	200	1.0	100m	10*					
1N3180	S			S	110	1.5	500m	5.0*					
1N3181	S	1N5237A	1N5221	Z						7.7	14	10	0.6W
1N3182			Table 3	V									
1N3183	S			G	350	1.0	0.5		4.0				
1N3184	S			G	500	1.0	0.5		4.0				
1N3185	S			G	700	2.0	0.5		4.0				
1N3186	S			G	1000	2.0	0.5		4.0				
1N3187	S			G	1500	3.0	0.5		4.0				
1N3188	S			G	2000	4.0	0.5		4.0				
1N3189	S	1N4003	1N4001	G	200	1.1	1.0	0.2	30				
1N3190	S	1N4004	1N4001	G	400	1.1	1.0	0.2	30				
1N3191	S	1N4005	1N4001	G	600	1.1	1.0	0.2	30				
1N3192	S			S	200	1.0	100m	10*					
1N3193	S	1N4003	1N4001	G	200	1.2	0.75	0.2	40				
1N3194	S	1N4004	1N4001	G	400	1.2	0.75	0.2	40				
1N3195	S	1N4005	1N4001	G	600	1.2	0.75	0.2	40				
1N3196	S	1N4006	1N4001	G	800	1.2	0.75	0.2	40				
1N3197	G			S	30	1.0	150m	50*	0.3				
1N3198	S	1N5221B	1N5221	Z						2.25	10	2.0	0.4W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3199	S	1N3155	1N3154	R						8.8	0.005	10	50/100
1N3200	S	1N3156	1N3154	R						8.8	0.003	10	50/100
1N3201	S	1N3156	1N3154	R						8.8	0.002	10	50/100
1N3202	S	1N3157	1N3154	R						8.8	0.001	10	50/100
1N3203	G			S	25	0.5	35m	50*	0.3				
1N3206	S			S	80	1.0	10m	5.0*	4.0				
1N3207	S			S	50	1.0	150m	0.05*	6.0				
★1N3208	S		1N3208	G	50	1.5	15	10	250				
★1N3209	S		1N3208	G	100	1.5	15	10	250				
★1N3210	S		1N3208	G	200	1.5	15	10	250				
★1N3211	S		1N3208	G	300	1.5	15	10	250				
★1N3212	S		1N3208	G	400	1.5	15	10	250				
★1N3213	S		1N248B	G	500	1.5	15	10	250				
★1N3214	S		1N248B	G	600	1.5	15	10	250				
1N3215	S			S	80	0.7	1.0m	10*	0.25				
1N3217 thru 1N3222	G			T									
1N3223	S			S	150	1.5	4.0m	20*	800				
1N3225	G			S	40	1.0	5.0m	33*	0.5				
1N3227	S	1N4002	1N4001	G	100	3.3	0.5	0.250	12.5				
1N3228	S	1N4003	1N4001	G	200	3.3	0.5	0.250	12.5				
1N3229	S	1N4004	1N4001	G	400	3.3	0.5	0.250	12.5				
1N3230	S	1N4005	1N4001	G	600	3.3	0.5	0.250	12.5				
1N3231	S	1N4006	1N4001	G	800	3.3	0.5	0.250	12.5				
1N3232	S	1N4007	1N4001	G	1000	3.3	0.5	0.250	12.5				
1N3233	S			G	1200	3.3	0.5	0.250	12.5				
1N3234	S			G	1500	3.3	0.5	0.250	12.5				
1N3235	S			G	1800	3.3	0.5	0.250	12.5				
1N3236	S			G	2000	3.3	0.5	0.250	12.5				
1N3237	S	1N4001	1N4001	G	50	2.2	0.75	0.250	15.0				
1N3238	S	1N4002	1N4001	G	100	2.2	0.75	0.250	15.0				
1N3239	S	1N4003	1N4001	G	200	2.2	0.75	0.250	15.0				
1N3240	S	1N4004	1N4001	G	400	2.2	0.75	0.250	15.0				
1N3241	S	1N4005	1N4001	G	600	2.2	0.75	0.250	15.0				
1N3242	S	1N4006	1N4001	G	800	2.2	0.75	0.250	15.0				
1N3243	S	1N4007	1N4001	G	1000	2.2	0.75	0.250	15.0				
1N3244	S			G	1200	2.2	0.75	0.250	15.0				
1N3245	S			G	1500	2.2	0.75	0.250	15.0				
1N3246	S	1N4001	1N4001	G	50	1.1	1.0	0.250	20.0				
1N3247	S	1N4002	1N4001	G	100	1.1	1.0	0.250	20.0				
1N3248	S	1N4003	1N4001	G	200	1.1	1.0	0.250	20.0				
1N3249	S	1N4004	1N4001	G	400	1.1	1.0	0.250	20.0				
1N3250	S	1N4005	1N4001	G	600	1.1	1.0	0.250	20.0				
1N3251	S	1N4006	1N4001	G	800	1.1	1.0	0.250	20.0				
1N3252	S	1N4007	1N4001	G	1000	1.1	1.0	0.250	20.0				
1N3253	S	1N4003	1N4001	G	200	1.2	0.75	0.2	40				
1N3254	S	1N4004	1N4001	G	400	1.2	0.75	0.2	40				
1N3255	S	1N4005	1N4001	G	600	1.2	0.75	0.2	40				
1N3256	S	1N4006	1N4001	G	800	1.2	0.5	0.2	40				
1N3257	S			S	80	1.0	30m	0.025*	300				
1N3258	S			S	80	1.0	100m	0.025*	400				
1N3260	S	MR1220SB	MR1220	G	50	1.6	160	12	2000				
1N3261	S	MR1221SB	MR1220	G	100	1.6	160	12	2000				
1N3262	S	MR1222SB	MR1220	G	150	1.6	160	12	2000				
1N3263	S	MR1223SB	MR1220	G	200	1.6	160	12	2000				
1N3264	S	MR1224SB	MR1220	G	250	1.6	160	12	2000				
1N3265	S	MR1225SB	MR1220	G	300	1.6	160	12	2000				
1N3266	S	MR1226SB	MR1220	G	350	1.6	160	12	2000				
1N3267	S	MR1227SB	MR1220	G	400	1.6	160	12	2000				
1N3268	S	MR1228SB	MR1220	G	500	1.6	160	12	2000				
1N3269	S	MR1229SB	MR1220	G	600	1.6	160	12	2000				
1N3270	S			G	700	1.6	160	12	2000				
1N3271	S			G	800	1.6	160	12	2000				
1N3272	S			G	900	1.6	160	12	2000				
1N3273	S			G	1000	1.6	160	12	2000				
1N3274	S			G	1200	1.4	160	12	2000				
1N3275	S			G	1400	1.4	160	12	2000				
1N3276	S			G	1600	1.4	160	12	2000				
1N3277	S			G	200	1.3	0.75		25				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3278	S			G	400	1.3	0.75		25				
1N3279	S			G	600	1.3	0.75		25				
1N3280	S			G	800	1.3	0.75		25				
1N3281	S			G	1000	1.3	0.75		25				
1N3282	S		1N3213	G	1000	3.7	0.1		2.5				
1N3283	S		1N3213	G	1500	3.7	0.1		2.5				
1N3284	S		1N3213	G	2000	3.7	0.1		2.5				
1N3285	S		1N3213	G	2500	3.7	0.1		2.5				
1N3286	S		1N3213	G	3000	3.7	0.1		2.5				
1N3287	G			S	6.0	0.312	1.0m	15*					
1N3288	S			G	100	1.5	100	200	1600				
1N3288A	S	MR1811R		G	100	1.5	100	24	2300				
1N3289	S			G	200	1.5	100	300	1600				
1N3289A	S	MR1813R		G	200	1.5	100	24	2300				
1N3290	S			G	300	1.5	100	400	1600				
1N3290A	S	MR1815R		G	300	1.5	100	24	2300				
1N3291	S			G	400	1.5	100	525	1600				
1N3291A	S	MR1817R		G	400	1.5	100	24	2300				
1N3292	S			G	500	1.5	100	650	1600				
1N3292A	S			G	500	1.5	100	21	1600				
1N3292B	S	MR1818SB		G	500	1.5	100	21	2300				
1N3293	S			G	600	1.5	100	800	1600				
1N3293A	S	MR1819SB		G	600	1.5	100	17	2300				
1N3294	S			G	800	1.5	100	1050	1600				
1N3294A	S			G	800	1.5	100	13	2300				
1N3295	S			G	1000	1.5	100	1300	1600				
1N3295A	S			G	1000	1.5	100	11	2300				
1N3296	S			G	1200	1.5	100	1600	1600				
1N3296A	S			G	1200	1.5	100	9.0	2300				
1N3297	S			G	1400	1.5	100	1800	1600				
1N3297A	S			G	1400	1.5	100	7.0	2300				
1N3298	S			S	70	0.9	500m	0.2*	20				
1N3298A	S			S	70	0.9	0.5	0.2*					
1N3299 thru			Table 1										
1N3304,A			Table 1										
★1N3305	S		1N2804	Z						6.8	1850	20	50W
★1N3305A	S		1N2804	Z						6.8	1850	10	50W
★1N3305B	S		1N2804	Z						6.8	1850	5.0	50W
★1N3306	S		1N2804	Z						7.5	1700	20	50W
★1N3306A	S		1N2804	Z						7.5	1700	10	50W
★1N3306B	S		1N2804	Z						7.5	1700	5.0	50W
★1N3307	S		1N2804	Z						8.2	1500	20	50W
★1N3307A	S		1N2804	Z						8.2	1500	10	50W
★1N3307B	S		1N2804	Z						8.2	1500	5.0	50W
★1N3308	S		1N2804	Z						9.1	1370	20	50W
★1N3308A	S		1N2804	Z						9.1	1370	10	50W
★1N3308B	S		1N2804	Z						9.1	1370	5.0	50W
★1N3309	S		1N2804	Z						10	1200	20	50W
★1N3309A	S		1N2804	Z						10	1200	10	50W
★1N3309B	S		1N2804	Z						10	1200	5.0	50W
★1N3310	S		1N2804	Z						11	1100	20	50W
★1N3310A	S		1N2804	Z						11	1100	10	50W
★1N3310B	S		1N2804	Z						11	1100	5.0	50W
★1N3311	S		1N2804	Z						12	1000	20	50W
★1N3311A	S		1N2804	Z						12	1000	10	50W
★1N3311B	S		1N2804	Z						12	1000	5.0	50W
★1N3312	S		1N2804	Z						13	960	20	50W
★1N3312A	S		1N2804	Z						13	960	10	50W
★1N3312B	S		1N2804	Z						13	960	5.0	50W
★1N3313	S		1N2804	Z						14	890	20	50W
★1N3313A	S		1N2804	Z						14	890	10	50W
★1N3313B	S		1N2804	Z						14	890	5.0	50W
★1N3314	S		1N2804	Z						15	830	20	50W
★1N3314A	S		1N2804	Z						15	830	10	50W
★1N3314B	S		1N2804	Z						15	830	5.0	50W
★1N3315	S		1N2804	Z						16	780	20	50W
★1N3315A	S		1N2804	Z						16	780	10	50W
★1N3315B	S		1N2804	Z						16	780	5.0	50W
★1N3316	S		1N2804	Z						17	740	20	50W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3316A	S		1N2804	Z						17	740	10	50W
★1N3316B	S		1N2804	Z						17	740	5.0	50W
★1N3317	S		1N2804	Z						18	700	20	50W
★1N3317A	S		1N2804	Z						18	700	10	50W
★1N3317B	S		1N2804	Z						18	700	5.0	50W
★1N3318	S		1N2804	Z						19	660	20	50W
★1N3318A	S		1N2804	Z						19	660	10	50W
★1N3318B	S		1N2804	Z						19	660	5.0	50W
★1N3319	S		1N2804	Z						20	630	20	50W
★1N3319A	S		1N2804	Z						20	630	10	50W
★1N3319B	S		1N2804	Z						20	630	5.0	50W
★1N3320	S		1N2804	Z						22	570	20	50W
★1N3320A	S		1N2804	Z						22	570	10	50W
★1N3320B	S		1N2804	Z						22	570	5.0	50W
★1N3321	S		1N2804	Z						24	520	20	50W
★1N3321A	S		1N2804	Z						24	520	10	50W
★1N3321B	S		1N2804	Z						24	520	5.0	50W
★1N3322	S		1N2804	Z						25	500	20	50W
★1N3322A	S		1N2804	Z						25	500	10	50W
★1N3322B	S		1N2804	Z						25	500	5.0	50W
★1N3323	S		1N2804	Z						27	460	20	50W
★1N3323A	S		1N2804	Z						27	460	10	50W
★1N3323B	S		1N2804	Z						27	460	5.0	50W
★1N3324	S		1N2804	Z						30	420	20	50W
★1N3324A	S		1N2804	Z						30	420	10	50W
★1N3324B	S		1N2804	Z						30	420	5.0	50W
★1N3325	S		1N2804	Z						33	380	20	50W
★1N3325A	S		1N2804	Z						33	380	10	50W
★1N3325B	S		1N2804	Z						33	380	5.0	50W
★1N3326	S		1N2804	Z						36	350	20	50W
★1N3326A	S		1N2804	Z						36	350	10	50W
★1N3326B	S		1N2804	Z						36	350	5.0	50W
★1N3327	S		1N2804	Z						39	320	20	50W
★1N3327A	S		1N2804	Z						39	320	10	50W
★1N3327B	S		1N2804	Z						39	320	5.0	50W
★1N3328	S		1N2804	Z						43	290	20	50W
★1N3328A	S		1N2804	Z						43	290	10	50W
★1N3328B	S		1N2804	Z						43	290	5.0	50W
★1N3329	S		1N2804	Z						45	280	20	50W
★1N3329A	S		1N2804	Z						45	280	10	50W
★1N3329B	S		1N2804	Z						45	280	5.0	50W
★1N3330	S		1N2804	Z						47	270	20	50W
★1N3330A	S		1N2804	Z						47	270	10	50W
★1N3330B	S		1N2804	Z						47	270	5.0	50W
★1N3331	S		1N2804	Z						50	250	20	50W
★1N3331A	S		1N2804	Z						50	250	10	50W
★1N3331B	S		1N2804	Z						50	250	5.0	50W
★1N3332	S		1N2804	Z						51	245	20	50W
★1N3332A	S		1N2804	Z						51	245	10	50W
★1N3332B	S		1N2804	Z						51	245	5.0	50W
★1N3333	S		1N2804	Z						52	240	20	50W
★1N3333A	S		1N2804	Z						52	240	10	50W
★1N3333B	S		1N2804	Z						52	240	5.0	50W
★1N3334	S		1N2804	Z						56	220	20	50W
★1N3334A	S		1N2804	Z						56	220	10	50W
★1N3334B	S		1N2804	Z						56	220	5.0	50W
★1N3335	S		1N2804	Z						62	200	20	50W
★1N3335A	S		1N2804	Z						62	200	10	50W
★1N3335B	S		1N2804	Z						62	200	5.0	50W
★1N3336	S		1N2804	Z						68	180	20	50W
★1N3336A	S		1N2804	Z						68	180	10	50W
★1N3336B	S		1N2804	Z						68	180	5.0	50W
★1N3337	S		1N2804	Z						75	170	20	50W
★1N3337A	S		1N2804	Z						75	170	10	50W
★1N3337B	S		1N2804	Z						75	170	5.0	50W
★1N3338	S		1N2804	Z						82	150	20	50W
★1N3338A	S		1N2804	Z						82	150	10	50W
★1N3338B	S		1N2804	Z						82	150	5.0	50W
★1N3339	S		1N2804	Z						91	140	20	50W
★1N3339A	S		1N2804	Z						91	140	10	50W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3339B	S		1N2804	Z						91	140	5.0	50W
★1N3340	S		1N2804	Z						100	120	20	50W
★1N3340A	S		1N2804	Z						100	120	10	50W
★1N3340B	S		1N2804	Z						100	120	5.0	50W
★1N3341	S		1N2804	Z						105	120	20	50W
★1N3341A	S		1N2804	Z						105	120	10	50W
★1N3341B	S		1N2804	Z						105	120	5.0	50W
★1N3342	S		1N2804	Z						110	110	20	50W
★1N3342A	S		1N2804	Z						110	110	10	50W
★1N3342B	S		1N2804	Z						110	110	5.0	50W
★1N3343	S		1N2804	Z						120	100	20	50W
★1N3343A	S		1N2804	Z						120	100	10	50W
★1N3343B	S		1N2804	Z						120	100	5.0	50W
★1N3344	S		1N2804	Z						130	95	20	50W
★1N3344A	S		1N2804	Z						130	95	10	50W
★1N3344B	S		1N2804	Z						130	95	5.0	50W
★1N3345	S		1N2804	Z						140	90	20	50W
★1N3345A	S		1N2804	Z						140	90	10	50W
★1N3345B	S		1N2804	Z						140	90	5.0	50W
★1N3346	S		1N2804	Z						150	85	20	50W
★1N3346A	S		1N2804	Z						150	85	10	50W
★1N3346B	S		1N2804	Z						150	85	5.0	50W
★1N3347	S		1N2804	Z						160	80	20	50W
★1N3347A	S		1N2804	Z						160	80	10	50W
★1N3347B	S		1N2804	Z						160	80	5.0	50W
★1N3348	S		1N2804	Z						175	70	20	50W
★1N3348A	S		1N2804	Z						175	70	10	50W
★1N3348B	S		1N2804	Z						175	70	5.0	50W
★1N3349	S		1N2804	Z						180	68	20	50W
★1N3349A	S		1N2804	Z						180	68	10	50W
★1N3349B	S		1N2804	Z						180	68	5.0	50W
★1N3350	S		1N2804	Z						200	65	20	50W
★1N3350A	S		1N2804	Z						200	65	10	50W
★1N3350B	S		1N2804	Z						200	65	5.0	50W
1N3353	G			B									
1N3354	S			G	10	1.2	3.0	0.020	30				
1N3355	S			G	15	1.2	3.0	0.020	30				
1N3356	S			G	25	1.2	3.0	0.010	30				
1N3357	S			G	50	1.2	3.0	0.010	30				
1N3358	S			G	75	1.2	3.0	0.010	30				
1N3359	S			G	100	1.2	3.0	0.010	30				
1N3360	S			G	150	1.2	3.0	0.010	30				
1N3361	S			G	200	1.2	3.0	0.010	30				
1N3362	S			G	300	1.2	3.0	0.010	30				
1N3363	S			G	400	1.2	3.0	0.010	30				
1N3364	S			G	500	1.2	3.0	0.010	30				
1N3365	S			G	600	1.2	3.0	0.010	30				
1N3366	S			G	700	1.2	3.0	0.010	30				
1N3367	S			G	800	2.0	3.0	0.010	30				
1N3368	S			G	900	2.0	3.0	0.010	30				
1N3369	S			G	1000	2.5	3.0	0.025	30				
1N3370	S			G	1200	2.5	3.0	0.025	30				
1N3371	S			G	1500	2.5	3.0	0.025	30				
1N3372	S			G	10	1.0	20	0.315	200				
1N3373	S			G	25	1.0	20	0.315	200				
1N3374	S			G	50	1.0	20	0.315	200				
1N3375	S			G	100	1.0	20	0.315	200				
1N3376	S			G	150	1.0	20	0.315	200				
1N3377	S			G	200	1.0	20	0.315	200				
1N3378	S			G	300	1.0	20	0.315	200				
1N3379	S			G	400	1.0	20	0.315	200				
1N3380	S			G	500	1.0	20	0.315	200				
1N3381	S			S	15	1.0	500m	10*					
1N3382	S			S	15	1.0	500m	10*					
1N3383	S			S	50	1.0	500m	10*					
1N3384	S			S	75	1.0	500m	15*					
1N3385	S			S	100	1.0	500m	20*					
1N3386	S			S	150	1.0	500m	20*					
1N3387	S			S	200	1.0	500m	20*					
1N3388	S			S	250	1.0	500m	25*					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3389	S			S	300	1.0	500m	25*					
1N3390	S			S	400	1.0	500m	25*					
1N3391	S			S	500	1.0	500m	25*					
1N3392	S			Z						1.5	50	10	500m
1N3393	S			C						1.8	50	10	500m
1N3394	S			C						2.2	50	10	500m
1N3395	S			C						2.7	50	10	500m
1N3396	S			C						3.3	30	10	500m
1N3397	S			C						3.9	30	10	500m
1N3398	S			C						4.7	30	10	500m
1N3399	S			C						5.6	20	10	500m
1N3400	S			C						6.8	20	10	500m
1N3401	S			C						8.2	10	10	500m
1N3402	S			C						10	10	10	500m
1N3403	S			C						12	10	10	500m
1N3404	S			C						15	10	10	500m
1N3405	S			C						18	10	10	500m
1N3406	S			C						22	3.0	10	500m
1N3407	S			C						27	3.0	10	500m
1N3408	S			C						33	3.0	10	500m
1N3409	S			C						39	1.5	10	500m
1N3410	S			C						47	1.5	10	500m
1N3411	S	1N5234A	1N5221	Z						6.2	1.0	10	500m
1N3412	S	1N5235A	1N5221	Z						6.8	1.0	10	500m
1N3413	S	1N5236A	1N5221	Z						7.5	1.0	10	500m
1N3414	S	1N5237A	1N5221	Z						8.2	1.0	10	500m
1N3415	S	1N5240A	1N5221	Z						10	1.0	10	500m
1N3416	S	1N5242A	1N5221	Z						12	1.0	10	500m
1N3417	S	1N5245A	1N5221	Z						15	1.0	10	500m
1N3418	S	1N5248A	1N5221	Z						18	1.0	10	500m
1N3419	S	1N5251A	1N5221	Z						22	1.0	10	500m
1N3420	S	1N5254A	1N5221	Z						27	1.0	10	500m
1N3421	S	1N5256A	1N5221	Z						30	1.0	10	500m
1N3422	S	1N5257A	1N5221	Z						33	1.0	10	500m
1N3423	S	1N5259A	1N5221	Z						39	1.0	10	500m
1N3424	S	1N5261A	1N5221	Z						47	1.0	10	500m
1N3425	S	1N5263A	1N5221	Z						56	1.0	10	500m
1N3426	S	1N5266A	1N5222	Z						68	1.0	10	500m
1N3427	S	1N5268A	1N5221	Z						82	1.0	10	500m
1N3428	S	1N5271A	1N5221	Z						100	1.0	10	500m
1N3429	S	1N5273A	1N5221	Z						120	1.0	10	500m
1N3430	S	1N5276A	1N5221	Z						150	1.0	10	500m
1N3431	S	1N5279A	1N5221	Z						180	1.0	10	500m
1N3432	S	1N5281A	1N5221	Z						220	1.0	10	500m
1N3433	S	1N4738	1N4728	Z						8.2	25	10	2.0W
1N3434	S	1N4740	1N4728	Z						10.0	25	10	2.0W
1N3435	S	1N4742	1N4728	Z						12.0	25	10	2.0W
1N3436	S	1N4744	1N4728	Z						15.0	25	10	2.0W
1N3437	S	1N4746	1N4728	Z						18.0	25	10	2.0W
1N3438	S	1N4748	1N4728	Z						22.0	7.5	10	2.0W
1N3439	S	1N4750	1N4728	Z						27.0	7.5	10	2.0W
1N3440	S	1N4752	1N4728	Z						33.0	7.5	10	2.0W
1N3441	S	1N4754	1N4728	Z						39.0	7.5	10	2.0W
1N3442	S	1N4756	1N4728	Z						47.0	7.5	10	2.0W
1N3443	S	1N4735	1N4728	Z						6.2	2.0	10	2.0W
1N3444	S	1N4736	1N4728	Z						6.8	2.0	10	2.0W
1N3445	S	1N4738	1N4728	Z						8.2	2.0	10	2.0W
1N3446	S	1N4740	1N4728	Z						10	2.0	10	2.0W
1N3447	S	1N4742	1N4728	Z						12	2.0	10	2.0W
1N3448	S	1N4744	1N4728	Z						15	2.0	10	2.0W
1N3449	S	1N4746	1N4728	Z						18	2.0	10	2.0W
1N3450	S	1N4748	1N4728	Z						22	2.0	10	2.0W
1N3451	S	1N4750	1N4728	Z						27	2.0	10	2.0W
1N3452	S	1N4751	1N4728	Z						30	2.0	10	2.0W
1N3453	S	1N4752	1N4728	Z						33	2.0	10	2.0W
1N3454	S	1N4754	1N4728	Z						39	2.0	10	2.0W
1N3455	S	1N4756	1N4728	Z						47	2.0	10	2.0W
1N3456	S	1N4758	1N4728	Z						56	2.0	10	2.0W
1N3457	S	1N4760	1N4728	Z						68	2.0	10	2.0W
1N3458	S	1N4762	1N4728	Z						82	2.0	10	2.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3459	S	1N4764	1N4728	Z						**100**	2.0	10	**2.0W**
1N3460	S	1M120ZS10	1N4728	Z						**120**	2.0	10	**2.0W**
1N3461	S	1M150ZS10	1N4728	Z						**150**	2.0	10	**2.0W**
1N3462	S	1M180ZS10	1N4728	Z						**180**	2.0	10	**2.0W**
1N3463	S	1M200ZS5	1N4728	Z						**220**	2.0	10	**2.0W**
1N3464	S			G	**8500**	**30.0**	**0.1**	**0.001**	**2.0**				
1N3465	G			S	60	1.0	200m	20*					
1N3466	G			S	40	1.0	200m	15*					
1N3467	G			S	15	0.5	20m	15*	2.0				
1N3468	G			S	15	0.5	20m	60*	2.0				
1N3469	G			S	35	0.5	600m	15*					
1N3470	G			S	35	0.5	600m	30*					
1N3471	S			S	40	1.0	10m	20n	2.0				
1N3473	S			G	**200**	**1.4**	**0.75**	**0.5**	**20**				
1N3474	S			G	**400**	**1.4**	**0.75**	**0.5**	**20**				
1N3475	S			G	**600**	**1.4**	**0.75**	**0.5**	**20**				
1N3476	S			G	**800**	**1.4**	**0.5**	**0.5**	**20**				
1N3477	S	1N5221A	1N5221	Z						**2.2**	5.0	10	**250m**
1N3477A	S	1N5221B	1N5221	Z						**2.2**	5.0	5.0	**250m**
1N3478	S			S	200	1.0	500m	10*					
1N3479	S			S	400	1.0	500m	10*					
1N3480	S			S	600	1.0	500m	10*					
1N3481	G		Table 4	M									
1N3482	G		Table 4	M									
1N3483	G			S	8.0	0.6	10m	30*					
1N3484	G			S	75	0.45	10m	4.0*					
1N3485	S			S	175	1.0	10m	25n	0.05				
1N3486	S	1N4007	1N4001	G	**1000**	**2.0**	**0.4**	**0.05**	**10**				
1N3487	S	MR1-1200	MR1-1200	G	**1200**	**2.0**	**0.4**	**0.05**	**10**				
1N3488			Table 3	V									
1N3489			Table 1	4									
1N3490			Table 1	4									
★1N3491	S		1N3491	G	**50**	**1.7**	**18**	**1.0**	**300**				
★1N3492	S		1N3491	G	**100**	**1.7**	**18**	**1.0**	**300**				
★1N3493	S		1N3491	G	**200**	**1.7**	**18**	**1.0**	**300**				
★1N3494	S		1N3491	G	**300**	**1.7**	**18**	**1.0**	**300**				
★1N3495	S		1N3491	G	**400**	**1.7**	**18**	**1.0**	**300**				
1N3496	S	1N823	1N821	R						6.2	0.005	7.5	-55/100
1N3497	S	1N825	1N821	R						6.2	0.002	7.5	-55/100
1N3498	S	1N827	1N821	R						6.2	0.001	7.5	-55/100
1N3499	S	1N829	1N821	R						6.2	0.0005	7.5	-55/100
1N3500	S	1N821	1N821	R						6.2	0.01	7.5	-55/100
1N3501	S	MZ640	MZ600	R						6.35	0.01	7.5	-55/100
1N3502	S	MZ620	MZ600	R						6.35	0.01	7.5	-55/100
1N3503	S	MZ610	MZ600	R						6.35	0.005	7.5	-55/100
1N3504	S	MZ605	MZ600	R						6.35	0.002	7.5	-55/100
1N3506	S	1N5226B	1N5221	Z						**3.3**	20	5.0	**20W**
1N3507	S	1N5227B	1N5221	Z						**3.6**	20	5.0	**20W**
1N3508	S	1N5228B	1N5221	Z						**3.9**	20	5.0	**20W**
1N3509	S	1N5229B	1N5221	Z						**4.3**	20	5.0	**20W**
1N3510	S	1N5230B	1N5221	Z						**4.7**	20	5.0	**20W**
1N3511	S	1N5231B	1N5221	Z						**5.1**	20	5.0	**20W**
1N3512	S	1N5232B	1N5221	Z						**5.6**	20	5.0	**20W**
1N3513	S	1N5234B	1N5221	Z						**6.2**	20	5.0	**20W**
1N3514	S	1N5235B	1N5221	Z						**6.8**	20	5.0	**20W**
1N3515	S	1N5236B	1N5221	Z						**7.5**	10	5.0	**10W**
1N3516	S	1N5237B	1N5221	Z						**8.2**	10	5.0	**10W**
1N3517	S	1N5239B	1N5221	Z						**9.1**	10	5.0	**10W**
1N3518	S	1N5240B	1N5221	Z						**10**	10	5.0	**10W**
1N3519	S	1N5241B	1N5221	Z						**11**	10	5.0	**10W**
1N3520	S	1N5242B	1N5221	Z						**12**	10	5.0	**10W**
1N3521	S	1N5243B	1N5221	Z						**13**	10	5.0	**10W**
1N3522	S	1N5245B	1N5221	Z						**15**	5.0	5.0	**5.0W**
1N3523	S	1N5246B	1N5221	Z						**16**	5.0	5.0	**5.0W**
1N3524	S	1N5248B	1N5221	Z						**18**	5.0	5.0	**5.0W**
1N3525	S	1N5250B	1N5221	Z						**20**	5.0	5.0	**5.0W**
1N3526	S	1N5251B	1N5221	Z						**22**	5.0	5.0	**5.0W**
1N3527	S	1N5252B	1N5221	Z						**24**	5.0	5.0	**5.0W**
1N3528	S	1N5254B	1N5221	Z						**27**	4.0	5.0	**4.0W**
1N3529	S	1N5256B	1N5221	Z						**30**	4.0	5.0	**4.0W**

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3530	S	1N5257B	1N5221	Z						33	3.0	5.0	3.0W
1N3531	S	1N5258B	1N5221	Z						36	3.0	5.0	3.0W
1N3532	S	1N5259B	1N5221	Z						39	3.0	5.0	3.0W
1N3533	S	1N5260B	1N5221	Z						43	2.0	5.0	2.0W
1N3534	S	1N5261B	1N5221	Z						47	2.0	5.0	2.0W
1N3535	S			S									
1N3536	S			S									
1N3537	S			C						12	25	8.3	1.0W
1N3538	S			S	150		2.5m	2.0*					
1N3539	S			B									
1N3539A	S			B									
1N3540	S			B									
1N3540A	S			B									
1N3541	S			B									
1N3541A	S			B									
1N3542	S			B									
1N3542A	S			B									
1N3543	S			B									
1N3543A	S			B									
1N3544	S	1N4002	1N4001	G	**100**	**1.5**	**0.6**	**0.2**	**15**				
1N3545	S	1N4003	1N4001	G	**200**	**1.5**	**0.6**	**0.2**	**15**				
1N3546	S	1N4004	1N4001	G	**300**	**1.5**	**0.6**	**0.2**	**15**				
1N3547	S	1N4004	1N4001	G	**400**	**1.5**	**0.6**	**0.2**	**15**				
1N3548	S	1N4005	1N4001	G	**500**	**1.5**	**0.6**	**0.2**	**15**				
1N3549	S	1N4005	1N4001	G	**600**	**1.5**	**0.6**	**0.2**	**15**				
1N3550	S			S	180	1.0	50m		1.5				
1N3551			Table 3	V									
1N3552			Table 3	V									
1N3553	S	1N821	1N821	R						6.3	0.01	7.5	-55/100
1N3554			Table 3	V									
thru													
1N3557			Table 3	V									
1N3558	S			Z									
1N3559	G			S	24	1.0	200m	20*					
1N3560				T									
thru	G												
1N3562				T									
1N3563	S			G	**1000**	**1.2**	**0.4**	**0.2**	**40**				
1N3564	G			S	15	1.0	40m						
1N3565	S			S	6.0	2.0	2.0	25m					
1N3566	S			G	**800**	**2.25**	**1.0**	**0.5**	**20**				
1N3567	S			S	50	1.0	100m	0.05*	2.0				
1N3568	S			S	80	1.0	20m	1.0*	2.0				
1N3569	S	MR1121	MR1120	G	**100**	**1.3**	**3.5**	**0.4**	**35**				
1N3570	S	MR1123	MR1120	G	**200**	**1.3**	**3.5**	**0.4**	**35**				
1N3571	S	MR1123	MR1120	G	**300**	**1.3**	**3.5**	**0.4**	**35**				
1N3572	S	MR1124	MR1120	G	**400**	**1.3**	**3.5**	**0.4**	**35**				
1N3573	S	MR1125	MR1120	G	**500**	**1.3**	**3.5**	**0.4**	**35**				
1N3574	S	MR1126	MR1120	G	**600**	**1.3**	**3.5**	**0.4**	**35**				
1N3575	S			S	60	0.74	1.0m	0.75n					
1N3576	S			S	125	0.74	1.0m	0.75n					
1N3577	S			S	175	0.74	1.0m	0.75n					
1N3578	S			S	225	0.74	1.0m	0.75n					
1N3579	S			S	275	0.74	1.0m	0.75n					
★1N3580	S		1N2163	R						11.7	0.01	7.5	0/75
★1N3580A	S		1N2163	R						11.7	0.01	7.5	-55/100
★1N3580B	S		1N2163	R						11.7	0.01	7.5	-55/150
★1N3581	S		1N2163	R						11.7	0.005	7.5	0/75
★1N3581A	S		1N2163	R						11.7	0.005	7.5	-55/100
★1N3581B	S		1N2163	R						11.7	0.005	7.5	-55/150
★1N3582	S		1N2163	R						11.7	0.002	7.5	0/75
★1N3582A	S		1N2163	R						11.7	0.002	7.5	-55/100
★1N3582B	S		1N2163	R						11.7	0.002	7.5	-55/150
★1N3583	S		1N2163	R						11.7	0.001	7.5	0/75
★1N3583A	S		1N2163	R						11.7	0.001	7.5	-55/100
★1N3583B	S		1N2163	R						11.7	0.001	7.5	-55/150
1N3584	S	1N945	1N941	R						11.7	0.0005	7.5	0/75
1N3584A	S	1N945A	1N941	R						11.7	0.0005	7.5	-55/100
1N3584B	S	1N945B	1N941	R						11.7	0.0005	7.5	-55/150
1N3585	S	MR1240SB	MR1240	G	**50**	**1.25**	**400**	**25**	**8000**				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3586	S	MR1241SB	MR1240	G	**100**	**1.25**	**400**	**25**	**8000**				
1N3587	S	MR1243SB	MR1240	G	**200**	**1.25**	**400**	**25**	**8000**				
1N3588	S	MR1245SB	MR1240	G	**300**	**1.25**	**400**	**25**	**8000**				
1N3589	S	MR1247SB	MR1240	G	**400**	**1.25**	**400**	**25**	**8000**				
1N3590	S	MR1248SB	MR1240	G	**500**	**1.25**	**400**	**25**	**8000**				
1N3591	S	MR1249SB	MR1240	G	**600**	**1.25**	**400**	**25**	**8000**				
1N3592	G			S	30	0.35	2.0m	4.0*	0.04				
1N3593	S			S	40	1.0	10m	25n	10				
1N3594	S			S	60	1.0	50m	0.1m	6.0				
1N3595	S			S	125	1.0	200m	1.0m	3.0				
1N3596	S			S	20	1.0	30m	0.1*	4.0				
1N3597	S			S	150	1.2	400m	0.1*	0.3				
1N3598	S			S	50	0.85	10m	0.1*	4.0				
1N3599	S			S	150	1.0	100m	0.1*	50				
1N3600	S			S	50	1.0	200m	100*	6.0				
1N3601	S			S	75	1.0	10m	0.1*	5.0				
1N3602	S			S	50	1.0	20m	0.1*	5.0				
1N3603	S			S	30	1.0	30m	0.1*	5.0				
1N3604	S			S	75	1.0	50m	0.05*	2.0				
1N3605	S			S	40	0.55	0.1m	0.05*	2.0				
1N3606	S			S	75	0.55	0.1m	0.05*	2.0				
1N3607	S			S	75	1.0	50m	0.05*	2.0				
1N3608	S			S	40	0.55	0.1m	0.05*	2.0				
1N3609	S			S	75	0.55	0.1m	0.05*	2.0				
1N3611	S	1N4003	1N4001	S	200	1.0	750m	10*					
1N3612	S	1N4004	1N4001	S	400	1.0	750m	10*					
1N3613	S	1N4005	1N4001	S	600	1.0	750m	10*					
1N3614	S	1N4006	1N4001	S	800	1.0	750m	10*					
1N3615	S	MR1120	MR1120	G	**50**	**1.2**	**16**	**3.0**	**300**				
1N3616	S	MR1121	MR1120	G	**100**	**1.2**	**16**	**2.5**	**300**				
1N3617	S	MR1122	MR1120	G	**150**	**1.2**	**16**	**2.25**	**300**				
1N3618	S	MR1122	MR1120	G	**200**	**1.2**	**16**	**2.0**	**300**				
1N3619	S	MR1123	MR1120	G	**300**	**1.2**	**16**	**1.75**	**300**				
1N3620	S	MR1124	MR1120	G	**400**	**1.2**	**16**	**1.5**	**300**				
1N3621	S	MR1125	MR1120	G	**500**	**1.2**	**16**	**1.25**	**300**				
1N3622	S	MR1126	MR1120	G	**600**	**1.2**	**16**	**1.0**	**300**				
1N3623	S	MR1128	MR1120	G	**800**	**1.2**	**16**	**0.75**	**300**				
1N3624	S	MR1130	MR1120	G	**1000**	**1.2**	**16**	**0.6**	**300**				
1N3625	S			S	225	1.0	40m	0.5*	0.5				
1N3626	G			S	50	0.5	10m	1.0m	0.45				
1N3627			Table 3	V									
1N3628			Table 3	V									
1N3629	S			G	**100**	**1.0**	**0.75**	**0.01**	**30**				
1N3630	S			G	**200**	**1.0**	**0.75**	**0.01**	**30**				
1N3631	S			G	**300**	**1.0**	**0.75**	**0.01**	**30**				
1N3632	S			G	**400**	**1.0**	**0.75**	**0.01**	**30**				
1N3633	S			G	**500**	**1.0**	**0.75**	**0.01**	**30**				
1N3634	S			G	**600**	**1.0**	**0.75**	**0.01**	**30**				
1N3635	S			G	**700**	**1.0**	**0.75**	**0.01**	**30**				
1N3636	S			G	**800**	**1.0**	**0.75**	**0.01**	**30**				
1N3637	S			G	**900**	**1.0**	**0.75**	**0.01**	**30**				
1N3638	S			G	**1000**	**1.0**	**0.75**	**0.01**	**30**				
1N3639	S	1N4003	1N4001	G	**200**	**1.2**	**0.75**	**0.2**	**40**				
1N3640	S	1N4004	1N4001	G	**400**	**1.2**	**0.75**	**0.2**	**40**				
1N3641	S	1N4005	1N4001	G	**600**	**1.2**	**0.75**	**0.2**	**40**				
1N3642	S	1N4006	1N4001	G	**800**	**1.2**	**0.75**	**0.2**	**40**				
1N3643	S			S	1000	5.0	250m	5.0*					
1N3644	S			S	1500	5.0	250m	5.0*					
1N3645	S			S	1000	5.0	250m	5.0*					
1N3646	S			S	2500	5.0	250m	5.0*					
1N3647	S			S	3000	5.0	250m	5.0*					
1N3648	S			G	**10k**	**23**	**0.35**	**0.5**	**30**				
★1N3649	S	MR1128	MR1120	G	**800**	**1.1**	**1.0**	**0.005**	**25**				
1N3650	S	MR1130	MR1120	G	**1000**	**1.1**	**1.0**	**0.005**	**25**				
1N3653	S			S	90	1.0	400m	25n	4.0				
1N3654	S			S	90	1.0	50m	25n	4.0				
1N3655	S		Table 4	M									
1N3655A	S		Table 4	M									
1N3655B	S		Table 4	M									
1N3656	S			S	200	1.2	500m	0.01m					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts	@ I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3657	S			S	400	1.2	500m	0.01m					
1N3658	S			S	600	1.2	500m	0.01m					
★1N3659	S		1N3659	G	50	1.4	25	5.0	400				
★1N3660	S		1N3659	G	100	1.4	25	4.5	400				
★1N3661	S		1N3659	G	200	1.4	25	4.0	400				
★1N3662	S		1N3659	G	300	1.4	25	3.5	400				
★1N3663	S		1N3659	G	400	1.4	25	3.0	400				
1N3664	S			G	500	1.4	25	2.5	400				
1N3665	S			G	600	1.4	25	2.0	400				
1N3666	G			S	80	1.0	200m	25*	0.3				
1N3667	S			G	500	1.2	1.5	1.2	30				
1N3668	S			S	30	1.0	5.0m	0.1*	0.15				
1N3669	S			S	70	1.1	400m	0.25*	0.2				
1N3670	S	MR1128	MR1120	G	700	2.05	12	3.0	200				
1N3670A	S	MR1128	MR1120	G	700	1.5	12	0.9	240				
1N3671	S	MR1128	MR1120	G	800	2.05	12	2.0	200				
1N3671A	S	MR1128	MR1120	G	800	1.3	12	0.8	240				
1N3672	S	MR1130	MR1120	G	900	2.05	12	2.0	200				
1N3672A	S	MR1130	MR1120	G	900	1.15	12	0.7	240				
1N3673	S	MR1130	MR1120	G	1000	2.05	12	1.0	200				
1N3673A	S	MR1130	MR1120	G	1000	1.0	12	0.6	240				
★1N3675	S	1N4736	1N4728	Z						6.8	19	20	750m
★1N3675A	S	1N4736	1N4728	Z						6.8	19	10	750m
★1N3675B	S	1N4736A	1N4728	Z						6.8	19	5.0	750m
★1N3676	S	1N4737	1N4728	Z						7.5	17	20	750m
★1N3676A	S	1N4737	1N4728	Z						7.5	17	10	750m
★1N3676B	S	1N4737A	1N4728	Z						7.5	17	5.0	750m
★1N3677	S	1N4738	1N4728	Z						8.2	15	20	750m
★1N3677A	S	1N4738	1N4728	Z						8.2	15	10	750m
★1N3677B	S	1N4738A	1N4728	Z						8.2	15	5.0	750m
★1N3678	S	1N4739	1N4728	Z						9.1	14	20	750m
★1N3678A	S	1N4739	1N4728	Z						9.1	14	10	750m
★1N3678B	S	1N4739A	1N4728	Z						9.1	14	5.0	750m
★1N3679	S	1N4740	1N4728	Z						10	13	20	750m
★1N3679A	S	1N4740	1N4728	Z						10	13	10	750m
★1N3679B	S	1N4740A	1N4728	Z						10	13	5.0	750m
★1N3680	S	1N4741	1N4728	Z						11	12	20	750m
★1N3680A	S	1N4741	1N4728	Z						11	12	10	750m
★1N3680B	S	1N4741A	1N4728	Z						11	12	5.0	750m
★1N3681	S	1N4742	1N4728	Z						12	11	20	750m
★1N3681A	S	1N4742	1N4728	Z						12	11	10	750m
★1N3681B	S	1N4742A	1N4728	Z						12	11	5.0	750m
★1N3682	S	1N4743	1N4728	Z						13	9.5	20	750m
★1N3682A	S	1N4743	1N4728	Z						13	9.5	10	750m
★1N3682B	S	1N4743A	1N4728	Z						13	9.5	5.0	750m
★1N3683	S	1N4744	1N4728	Z						15	8.5	20	750m
★1N3683A	S	1N4744	1N4728	Z						15	8.5	10	750m
★1N3683B	S	1N4744A	1N4728	Z						15	8.5	5.0	750m
★1N3684	S	1N4745	1N4728	Z						16	7.8	20	750m
★1N3684A	S	1N4745	1N4728	Z						16	7.8	10	750m
★1N3684B	S	1N4745A	1N4728	Z						16	7.8	5.0	750m
★1N3685	S	1N4746	1N4728	Z						18	7.0	20	750m
★1N3685A	S	1N4746	1N4728	Z						18	7.0	10	750m
★1N3685B	S	1N4746A	1N4728	Z						18	7.0	5.0	750m
★1N3686	S	1N4747	1N4728	Z						20	6.2	20	750m
★1N3686A	S	1N4747	1N4728	Z						20	6.2	10	750m
★1N3686B	S	1N4747A	1N4728	Z						20	6.2	5.0	750m
★1N3687	S	1N4748	1N4728	Z						22	5.6	20	750m
★1N3687A	S	1N4748	1N4728	Z						22	5.6	10	750m
★1N3687B	S	1N4748A	1N4728	Z						22	5.6	5.0	750m
★1N3688	S	1N4749	1N4728	Z						24	5.2	20	750m
★1N3688A	S	1N4749	1N4728	Z						24	5.2	10	750m
★1N3688B	S	1N4749A	1N4728	Z						24	5.2	5.0	750m
★1N3689	S	1N4750	1N4728	Z						27	4.6	20	750m
★1N3689A	S	1N4750	1N4728	Z						27	4.6	10	750m
★1N3689B	S	1N4750A	1N4728	Z						27	4.6	5.0	750m
★1N3690	S	1N4751	1N4728	Z						30	4.2	20	750m
★1N3690A	S	1N4751	1N4728	Z						30	4.2	10	750m
★1N3690B	S	1N4751A	1N4728	Z						30	4.2	5.0	750m
★1N3691	S	1N4752	1N4728	Z						33	3.8	20	750m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3691A	S	1N4752	1N4728	Z						33	3.8	10	750m
★1N3691B	S	1N4752A	1N4728	Z						33	3.8	5.0	750m
★1N3692	S	1N4753	1N4728	Z						36	3.4	20	750m
★1N3692A	S	1N4753	1N4728	Z						36	3.4	10	750m
★1N3692B	S	1N4753A	1N4728	Z						36	3.4	5.0	750m
★1N3693	S	1N4754	1N4728	Z						39	3.2	20	750m
★1N3693A	S	1N4754	1N4728	Z						39	3.2	10	750m
★1N3693B	S	1N4754A	1N4728	Z						39	3.2	5.0	750m
★1N3694	S	1N4755	1N4728	Z						43	3.0	20	750m
★1N3694A	S	1N4755	1N4728	Z						43	3.0	10	750m
★1N3694B	S	1N4755A	1N4728	Z						43	3.0	5.0	750m
★1N3695	S	1N4756	1N4728	Z						47	2.7	20	750m
★1N3695A	S	1N4756	1N4728	Z						47	2.7	10	750m
★1N3695B	S	1N4756A	1N4728	Z						47	2.7	5.0	750m
★1N3696	S	1N4757	1N4728	Z						51	2.5	20	750m
★1N3696A	S	1N4757	1N4728	Z						51	2.5	10	750m
★1N3696B	S	1N4757A	1N4728	Z						51	2.5	5.0	750m
★1N3697	S	1N4758	1N4728	Z						56	2.2	20	750m
★1N3697A	S	1N4758	1N4728	Z						56	2.2	10	750m
★1N3697B	S	1N4758A	1N4728	Z						56	2.2	5.0	750m
★1N3698	S	1N4759	1N4728	Z						62	2.0	20	750m
★1N3698A	S	1N4759	1N4728	Z						62	2.0	10	750m
★1N3698B	S	1N4759A	1N4728	Z						62	2.0	5.0	750m
★1N3699	S	1N4760	1N4728	Z						68	1.8	20	750m
★1N3699A	S	1N4760	1N4728	Z						68	1.8	10	750m
★1N3699B	S	1N4760A	1N4728	Z						68	1.8	5.0	750m
★1N3700	S	1N4761	1N4728	Z						75	1.7	20	750m
★1N3700A	S	1N4761	1N4728	Z						75	1.7	10	750m
★1N3700B	S	1N4761A	1N4728	Z						75	1.7	5.0	750m
★1N3701	S	1N4762	1N4728	Z						82	1.5	20	750m
★1N3701A	S	1N4762	1N4728	Z						82	1.5	10	750m
★1N3701B	S	1N4762A	1N4728	Z						82	1.5	5.0	750m
★1N3702	S	1N4763	1N4728	Z						91	1.4	20	750m
★1N3702A	S	1N4763	1N4728	Z						91	1.4	10	750m
★1N3702B	S	1N4763A	1N4728	Z						91	1.4	5.0	750m
★1N3703	S	1N4764	1N4728	Z						100	1.3	20	750m
★1N3703A	S	1N4764	1N4728	Z						100	1.3	10	750m
★1N3703B	S	1N4764A	1N4728	Z						100	1.3	5.0	750m
1N3704	S	1M110ZS10	1N4728	Z						110	1.1	20	750m
1N3704A	S	1M110ZS10	1N4728	Z						110	1.1	10	750m
1N3704B	S	1M110ZS5	1N4728	Z						110	1.1	5.0	750m
1N3705	S	1M120ZS10	1N4728	Z						120	1.0	20	750m
1N3705A	S	1M120ZS10	1N4728	Z						120	1.0	10	750m
1N3705B	S	1M120ZS5	1N4728	Z						120	1.0	5.0	750m
1N3706	S	1M130ZS10	1N4728	Z						130	0.95	20	750m
1N3706A	S	1M130ZS10	1N4728	Z						130	0.95	10	750m
1N3706B	S	1M130ZS5	1N4728	Z						130	0.95	5.0	750m
1N3707	S	1M150ZS10	1N4728	Z						150	0.85	20	750m
1N3707A	S	1M150ZS10	1N4728	Z						150	0.85	10	750m
1N3707B	S	1M150ZS5	1N4728	Z						150	0.85	5.0	750m
1N3708	S	1M160ZS10	1N4728	Z						160	0.80	20	750m
1N3708A	S	1M160ZS10	1N4728	Z						160	0.80	10	750m
1N3708B	S	1M160ZS5	1N4728	Z						160	0.80	5.0	750m
1N3709	S	1M180ZS10	1N4728	Z						180	0.68	20	750m
1N3709A	S	1M180ZS10	1N4728	Z						180	0.68	10	750m
1N3709B	S	1M180ZS5	1N4728	Z						180	0.68	5.0	750m
1N3710	S	1M200ZS10	1N4728	Z						200	0.65	20	750m
1N3710A	S	1M200ZS10	1N4718	Z						200	0.65	10	750m
1N3710B	S	1M200ZS5	1N4728	Z						200	0.65	5.0	750m
1N3711	S			G	6000	11	0.15	0.025	5.0				
1N3712				T									
thru	G												
1N3721				T									
1N3722	S			S	50	1.0	20m	0.1*	10				
1N3723	S	1N4007	1N4001	G	1000	2.2	0.75	0.005	12				
1N3724	S	MR1-1200	MR1-1200	G	1200	2.2	0.75	0.005	12				
1N3725	S	MR1-1400	MR1-1200	G	1400	2.2	0.75	0.005	12				
1N3726	S	MR1-1600	MR1-1200	G	1600	2.2	0.75	0.005	12				
1N3727	S			G	1800	2.2	0.75	0.005	12				
1N3728	S			S	550	1.2	400m	0.1*					

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3729	S			S	600	1.0	5.0m	0.1*	0.5				
1N3730	S			S	80	1.0	750m	0.1*	15				
1N3731	S			S	80	1.0	100m	5.0*	3.0				
1N3732	S		1N4728	Z						5.1	40	5.0	1.0W
1N3733	S		Table 4	M									
1N3734	S			D									
1N3735	S	MR1231SB	MR1230	G	100	1.3	250	16	4500				
1N3736	S	MR1233SB	MR1230	G	200	1.3	250	16	4500				
1N3737	S	MR1235SB	MR1230	G	300	1.3	250	16	4500				
1N3738	S	MR1237SB	MR1230	G	400	1.3	250	16	4500				
1N3739	S	MR1238SB	MR1230	G	500	1.3	250	13	4500				
1N3740	S	MR1239SB	MR1230	G	600	1.3	250	12	4500				
1N3741	S			G	800	1.3	250	9.0	4500				
1N3742	S			G	1000	1.3	250	7.0	4500				
1N3743	S			G	1200	1.3	250	7.0	4500				
1N3744	S			G	1400	1.3	250	7.0	4500				
1N3745	S		Table 4	M									
1N3746	S		Table 4	M									
1N3747	S		Table 4	M									
1N3748	S	1N4003	1N4001	G	200	1.5	0.5		20				
1N3749	S	1N4004	1N4001	G	400	1.5	0.5		20				
1N3750	S	1N4005	1N4001	G	600	1.5	0.5		20				
1N3751	S	1N4006	1N4001	G	800	1.5	0.5		20				
1N3752	S	1N4007	1N4001	G	1000	1.5	0.5		20				
1N3753	G			S	55	1.0	150m	5.0*					
1N3754	S			G	100	1.2	0.15	0.3	15				
1N3755	S			G	200	1.2	0.15	0.3	15				
1N3756	S			G	400	1.2	0.15	0.3	15				
1N3757	S	1N4003	1N4001	G	200	1.0	1.0		30				
1N3758	S	1N4004	1N4001	G	400	1.0	1.0		30				
1N3759	S	1N4005	1N4001	G	600	1.0	1.0		30				
1N3760	S	1N4006	1N4001	G	800	1.0	1.0		30				
1N3761	S	1N4007	1N4001	G	1000	1.0	1.0		30				
1N3762	S			G	5300	12	0.065	0.005	15				
1N3763	S			R						20	0.002	10	-55/100
1N3764	S			G	3000	6.5	0.2	0.1	8.0				
1N3765	S			G	700	1.8	35	5.0	400				
1N3766	S			G	800	1.8	35	4.0	400				
1N3767	S			G	900	1.8	35	3.0	400				
1N3768	S			G	1000	1.8	35	2.0	400				
1N3769	G			S	90	0.5	25m	5.0*					
1N3770			Table 3	V									
1N3771			Table 1	4									
1N3772			Table 1	4									
1N3773	G			S	25	0.35	2.0m	4.0*	40				
1N3774	S			Z						1.15	10	2.0	0.34W
1N3775	S			G	1500	2.2	3.3	0.1	15				
1N3776	S			Z						10	25	10	6.0W
1N3777	S			S	40	1.1	10m	0.1*	4.0				
1N3778	S		Table 4	M									
1N3779	S	1N821A	1N821	R						6.5	0.015	7.5	-55/100
1N3780	S	1N821A	1N821	R						6.5	0.01	7.5	-55/100
1N3781	S	1N823A	1N821	R						6.5	0.005	7.5	-55/100
1N3782	S	1N825A	1N821	R						6.5	0.002	7.5	-55/100
1N3783	S	1N827A	1N821	R						6.5	0.001	7.5	-55/100
1N3784	S	1N829A	1N821	R						6.5	0.0005	7.5	-55/100
★1N3785	S		1N3785	Z						6.8	55	20	1.5W
★1N3785A	S		1N3785	Z						6.8	55	10	1.5W
★1N3785B	S		1N3785	Z						6.8	55	5.0	1.5W
★1N3786	S		1N3785	Z						7.5	50	20	1.5W
★1N3786A	S		1N3785	Z						7.5	50	10	1.5W
★1N3786B	S		1N3785	Z						7.5	50	5.0	1.5W
★1N3787	S		1N3785	Z						8.2	46	20	1.5W
★1N3787A	S		1N3785	Z						8.2	46	10	1.5W
★1N3787B	S		1N3785	Z						8.2	46	5.0	1.5W
★1N3788	S		1N3785	Z						9.1	41	20	1.5W
★1N3788A	S		1N3785	Z						9.1	41	10	1.5W
★1N3788B	S		1N3785	Z						9.1	41	5.0	1.5W
★1N3789	S		1N3785	Z						10	37	20	1.5W
★1N3789A	S		1N3785	Z						10	37	10	1.5W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3789B	S		1N3785	Z						10	37	5.0	1.5W
★1N3790	S		1N3785	Z						11	34	20	1.5W
★1N3790A	S		1N3785	Z						11	34	10	1.5W
★1N3790B	S		1N3785	Z						11	34	5.0	1.5W
★1N3791	S		1N3785	Z						12	31	20	1.5W
★1N3791A	S		1N3785	Z						12	31	10	1.5W
★1N3791B	S		1N3785	Z						12	31	5.0	1.5W
★1N3792	S		1N3785	Z						13	29	20	1.5W
★1N3792A	S		1N3785	Z						13	29	10	1.5W
★1N3792B	S		1N3785	Z						13	29	5.0	1.5W
★1N3793	S		1N3785	Z						15	25	20	1.5W
★1N3793A	S		1N3785	Z						15	25	10	1.5W
★1N3793B	S		1N3785	Z						15	25	5.0	1.5W
★1N3794	S		1N3785	Z						16	23	20	1.5W
★1N3794A	S		1N3785	Z						16	23	10	1.5W
★1N3794B	S		1N3785	Z						16	23	5.0	1.5W
★1N3795	S		1N3785	Z						18	21	20	1.5W
★1N3795A	S		1N3785	Z						18	21	10	1.5W
★1N3795B	S		1N3785	Z						18	21	5.0	1.5W
★1N3796	S		1N3785	Z						20	19	20	1.5W
★1N3796A	S		1N3785	Z						20	19	10	1.5W
★1N3796B	S		1N3785	Z						20	19	5.0	1.5W
★1N3797	S		1N3785	Z						22	17	20	1.5W
★1N3797A	S		1N3785	Z						22	17	10	1.5W
★1N3797B	S		1N3785	Z						22	17	5.0	1.5W
★1N3798	S		1N3785	Z						24	16	20	1.5W
★1N3798A	S		1N3785	Z						24	16	10	1.5W
★1N3798B	S		1N3785	Z						24	16	5.0	1.5W
★1N3799	S		1N3785	Z						27	14	20	1.5W
★1N3799A	S		1N3785	Z						27	14	10	1.5W
★1N3799B	S		1N3785	Z						27	14	5.0	1.5W
★1N3800	S		1N3785	Z						30	12	20	1.5W
★1N3800A	S		1N3785	Z						30	12	10	1.5W
★1N3800B	S		1N3785	Z						30	12	5.0	1.5W
★1N3801	S		1N3785	Z						33	11	20	1.5W
★1N3801A	S		1N3785	Z						33	11	10	1.5W
★1N3801B	S		1N3785	Z						33	11	5.0	1.5W
★1N3802	S		1N3785	Z						36	10	20	1.5W
★1N3802A	S		1N3785	Z						36	10	10	1.5W
★1N3802B	S		1N3785	Z						36	10	5.0	1.5W
★1N3803	S		1N3785	Z						39	10	20	1.5W
★1N3803A	S		1N3785	Z						39	10	10	1.5W
★1N3803B	S		1N3785	Z						39	10	5.0	1.5W
★1N3804	S		1N3785	Z						43	9.0	20	1.5W
★1N3804A	S		1N3785	Z						43	9.0	10	1.5W
★1N3804B	S		1N3785	Z						43	9.0	5.0	1.5W
★1N3805	S		1N3785	Z						47	8.0	20	1.5W
★1N3805A	S		1N3785	Z						47	8.0	10	1.5W
★1N3805B	S		1N3785	Z						47	8.0	5.0	1.5W
★1N3806	S		1N3785	Z						51	7.4	20	1.5W
★1N3806A	S		1N3785	Z						51	7.4	10	1.5W
★1N3806B	S		1N3785	Z						51	7.4	5.0	1.5W
★1N3807	S		1N3785	Z						56	6.7	20	1.5W
★1N3807A	S		1N3785	Z						56	6.7	10	1.5W
★1N3807B	S		1N3785	Z						56	6.7	5.0	1.5W
★1N3808	S		1N3785	Z						62	6.0	20	1.5W
★1N3808A	S		1N3785	Z						62	6.0	10	1.5W
★1N3808B	S		1N3785	Z						62	6.0	5.0	1.5W
★1N3809	S		1N3785	Z						68	5.5	20	1.5W
★1N3809A	S		1N3785	Z						68	5.5	10	1.5W
★1N3809B	S		1N3785	Z						68	5.5	5.0	1.5W
★1N3810	S		1N3785	Z						75	5.0	20	1.5W
★1N3810A	S		1N3785	Z						75	5.0	10	1.5W
★1N3810B	S		1N3785	Z						75	5.0	5.0	1.5W
★1N3811	S		1N3785	Z						82	4.5	20	1.5W
★1N3811A	S		1N3785	Z						82	4.5	10	1.5W
★1N3811B	S		1N3785	Z						82	4.5	5.0	1.5W
★1N3812	S		1N3785	Z						91	4.1	20	1.5W
★1N3812A	S		1N3785	Z						91	4.1	10	1.5W
★1N3812B	S		1N3785	Z						91	4.1	5.0	1.5W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts	@ I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3813	S		1N3785	Z						100	3.7	20	1.5W
★1N3813A	S		1N3785	Z						100	3.7	10	1.5W
★1N3813B	S		1N3785	Z						100	3.7	5.0	1.5W
★1N3814	S		1N3785	Z						110	3.4	20	1.5W
★1N3814A	S		1N3785	Z						110	3.4	10	1.5W
★1N3814B	S		1N3785	Z						110	3.4	5.0	1.5W
★1N3815	S		1N3785	Z						120	3.1	20	1.5W
★1N3815A	S		1N3785	Z						120	3.1	10	1.5W
★1N3815B	S		1N3785	Z						120	3.1	5.0	1.5W
★1N3816	S		1N3785	Z						130	2.9	20	1.5W
★1N3816A	S		1N3785	Z						130	2.9	10	1.5W
★1N3816B	S		1N3785	Z						130	2.9	5.0	1.5W
★1N3817	S		1N3785	Z						150	2.5	20	1.5W
★1N3817A	S		1N3785	Z						150	2.5	10	1.5W
★1N3817B	S		1N3785	Z						150	2.5	5.0	1.5W
★1N3818	S		1N3785	Z						160	2.3	20	1.5W
★1N3818A	S		1N3785	Z						160	2.3	10	1.5W
★1N3818B	S		1N3785	Z						160	2.3	5.0	1.5W
★1N3819	S		1N3785	Z						180	2.1	20	1.5W
★1N3819A	S		1N3785	Z						180	2.1	10	1.5W
★1N3819B	S		1N3785	Z						180	2.1	5.0	1.5W
★1N3820	S		1N3785	Z						200	1.9	20	1.5W
★1N3820A	S		1N3785	Z						200	1.9	10	1.5W
★1N3820B	S		1N3785	Z						200	1.9	5.0	1.5W
★1N3821	S		1N3821	Z						3.3	76	10	1.0W
★1N3821A	S		1N3821	Z						3.3	76	5.0	1.0W
★1N3822	S		1N3821	Z						3.6	69	10	1.0W
★1N3822A	S		1N3821	Z						3.6	69	5.0	1.0W
★1N3823	S		1N3821	Z						3.9	64	10	1.0W
★1N3823A	S		1N3821	Z						3.9	64	5.0	1.0W
★1N3824	S		1N3821	Z						4.3	58	10	1.0W
★1N3824A	S		1N3821	Z						4.3	58	5.0	1.0W
★1N3825	S		1N3821	Z						4.7	53	10	1.0W
★1N3825A	S		1N3821	Z						4.7	53	5.0	1.0W
★1N3826	S		1N3821	Z						5.1	49	10	1.0W
★1N3826A	S		1N3821	Z						5.1	49	5.0	1.0W
★1N3827	S		1N3821	Z						5.6	45	10	1.0W
★1N3827A	S		1N3821	Z						5.6	45	5.0	1.0W
★1N3828	S		1N3821	Z						6.2	41	10	1.0W
★1N3828A	S		1N3821	Z						6.2	41	5.0	1.0W
★1N3829	S		1N3821	Z						6.8	37	10	1.0W
★1N3829A	S		1N3821	Z						6.8	37	5.0	1.0W
★1N3830	S		1N3821	Z						7.5	34	10	1.0W
★1N3830A	S		1N3821	Z						7.5	34	5.0	1.0W
1N3831			Table 1	4									
thru													
1N3846			Table 1	4									
1N3847				T									
thru	G												
1N3860				T									
1N3861	G			T									
1N3862	G			T									
1N3863	G			T									
1N3864	S			S	125	1.5	200m	1.0n	0.9				
1N3865	G			S	80		100m	15*	0.5				
1N3866	S	1N4003	1N4001	G	200	1.5	1.0	0.05	25				
1N3867	S	1N4004	1N4001	G	400	1.5	1.0	0.5	25				
1N3868	S	1N4005	1N4001	G	600	1.5	1.0	0.05	25				
1N3869	S	1N5007	1N4001	G	1000	3.0	0.5	0.05	10				
1N3870	S	MR1-1600	MR1-1200	G	1500	3.0	0.5	0.05	10				
1N3871	S			G	2500	6.0	0.25	0.05	5.0				
1N3872	S			S	90	1.0	150m	0.1*	15				
1N3873	S			S	50	1.14	0.2	0.1*	4.0				
1N3874	S			G	50	1.5	6.0	3.0	75				
1N3875	S			G	100	1.5	6.0	3.0	75				
1N3876	S			G	200	1.5	6.0	3.0	75				
1N3877	S			G	300	1.5	6.0	3.0	75				
1N3878	S			G	400	1.5	6.0	3.0	75				
★1N3879	S		1N3879	F	50	1.5	6.0	3.0	150				
★1N3880	S		1N3879	F	150	1.5	6.0	3.0	150				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N3881	S		1N3879	F	200	1.5	6.0	3.0	150				
★1N3882	S		1N3879	F	300	1.5	6.0	3.0	150				
★1N3883	S		1N3879	F	400	1.5	6.0	3.0	150				
1N3884	S			G	50	1.5	12	3.0	150				
1N3885	S			G	100	1.5	12	3.0	150				
1N3886	S			G	200	1.5	12	3.0	150				
1N3887	S			G	300	1.5	12	3.0	150				
1N3888	S			G	400	1.5	12	3.0	150				
★1N3889	S		1N3889	F	50	1.5	12	3.0	200				
★1N3890	S		1N3889	F	100	1.5	12	3.0	200				
★1N3891	S		1N3889	F	200	1.5	12	3.0	200				
★1N3892	S		1N3889	F	300	1.5	12	3.0	200				
★1N3893	S		1N3889	F	400	1.5	12	3.0	200				
1N3894	S			S	400	1.0	400m	0.2*					
1N3895	S			S	350	1.0	200m	0.5*					
1N3896	S			Z						0.77	50	5.0	250m
1N3897	S			Z						1.5	30	5.0	250m
1N3898	S	1N5221B	1N5221	Z						2.0	20	5.0	250m
★1N3899	S		1N3899	F	50	1.5	20	6.0	250				
★1N3900	S		1N3899	F	100	1.5	20	6.0	250				
★1N3901	S		1N3899	F	200	1.5	20	6.0	250				
★1N3902	S		1N3899	F	300	1.5	20	6.0	250				
★1N3903	S		1N3899	F	400	1.5	20	6.0	250				
1N3904	S			G	50	1.5	20	6.0	225				
1N3905	S			G	100	1.5	20	6.0	225				
1N3906	S			G	200	1.5	20	6.0	225				
1N3907	S			G	300	1.5	20	6.0	225				
1N3908	S			G	400	1.5	20	6.0	225				
★1N3909	S		1N3909	F	50	1.5	30	10	300				
★1N3910	S		1N3909	F	100	1.5	30	10	300				
★1N3911	S		1N3909	F	200	1.5	30	10	300				
★1N3912	S		1N3909	F	300	1.5	30	10	300				
★1N3913	S		1N3909	F	400	1.5	30	10	300				
1N3914	S			G	50	1.5	30	10	300				
1N3915	S			G	100	1.5	30	10	300				
1N3916	S			G	200	1.5	30	10	300				
1N3917	S			G	300	1.5	30	10	300				
1N3918	S			G	400	1.5	30	10	300				
1N3919	S			G	1000	2.0	5.0	0.5	100				
1N3920	S			G	1500	2.0	5.0	0.5	100				
1N3921	S			G	2000	2.0	5.0	0.5	100				
1N3922	S			G	2500	2.0	5.0	0.5	100				
1N3923	S			G	3000	2.0	5.0	0.5	100				
1N3924	S			G	1000	2.0	10	0.5	100				
1N3925	S			G	1500	2.0	10	0.5	100				
1N3926	S			G	2000	2.0	10	0.5	100				
1N3927	S			G	2500	2.0	10	0.5	100				
1N3928	S			G	3000	2.0	10	0.5	100				
1N3929	S			S	1000	2.0	1.0	10*					
1N3930	S			S	1500	2.0	1.0	10*					
1N3931	S			S	2000	2.0	1.0	10*					
1N3932	S			S	1500	2.0	1.0	10*					
1N3933	S			S	3000	2.0	1.0	10*					
1N3934	S			G	1200	2.5	1.0	0.4	50				
1N3935			Table 1	4									
thru													
1N3937			Table 1	4									
1N3938	S	1N4003	1N4001	G	200	1.1	2.0	0.4	30				
1N3939	S	1N4004	1N4001	G	400	1.1	2.0	0.2	30				
1N3940	S	1N4005	1N4001	G	600	1.1	2.0	0.2	30				
1N3941	S	1N4006	1N4001	G	800	1.5	2.0	0.2	30				
1N3942	S	1N4007	1N4001	G	1000	1.5	2.0	0.2	30				
1N3943	S			S	3.0	2.5	300m	100*					
1N3944	G			S	15	0.75	10m	2.5*	12				
1N3945			Table 3	V									
thru													
1N3947			Table 3	V									
1N3948	S			T									
1N3949	S	1N2984B	1N2970	Z						20	250	5.0	10W
1N3950	S	1N3796B	1N3785	Z						20	19	5.0	1.5W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N3951	S	1.5M25Z5		Z						25	15	5.0	1.5W
1N3952	S			S	130	0.74	10m	25n					
1N3953	G			S	40	0.5	35m	50*	300				
1N3954	S			S	50	1.0	200m	0.1*	4.0				
1N3955	S			G	100	1.3	70	15	1200				
1N3956	S			S	40	0.55	100*	0.05*	2.0				
1N3957	S			S	1000	1.0	400m	10*					
1N3958	S	1N3880	1N4933	G	100	1.3	3.5	0.4	35				
1N3959	S	1N3881	1N4933	G	200	1.3	3.5	0.4	35				
1N3960	S	1N3882	1N4933	G	300	1.3	3.5	0.4	35				
1N3961	S	1N3883	1N4933	G	400	1.3	3.5	0.4	35				
1N3962	S	MR1366	1N4933	G	500	1.3	3.5	0.4	35				
1N3963	S	MR1366	1N4933	G	600	1.3	3.5	0.4	35				
1N3964	S			G	200	1.6	22	1.0	200				
1N3965	S			G	400	1.6	22	1.0	200				
1N3966	S			G	600	1.6	22	1.0	200				
1N3967	S			G	800	1.6	22	1.0	200				
1N3968	S			G	200	1.6	50	2.0	600				
1N3969	S			G	400	1.6	50	2.0	600				
1N3970	S			G	600	1.6	50	2.0	600				
1N3971	S			G	800	1.6	50	2.0	600				
1N3972	S			G	200	1.5	104	5.0	1500				
1N3973	S			G	400	1.5	104	5.0	1500				
1N3974	S			G	600	1.5	104	5.0	1500				
1N3975	S			G	800	1.5	104	5.0	1500				
1N3976	S			G	200	1.5	250	10	4000				
1N3977	S			G	400	1.5	250	10	4000				
1N3978	S			G	600	1.5	250	10	4000				
1N3979	S			G	800	1.5	250	10	4000				
1N3981	S			S	200	1.0	900m	0.01m					
1N3982	S			S	400	1.0	900m	0.01m					
1N3983	S			S	600	1.0	900m	0.01m					
1N3984	S	1N3997A	1N3993	Z						5.5	1000	5.0	10W
1N3985	S	1N3998A	1N3993	Z						6.0	1000	5.0	10W
1N3986	S	1N3998A	1N3993	Z						6.2	805	5.0	10W
1N3987	S			G	700	1.4	6.0	0.9	150				
1N3988	S	MR1128	MR1120	G	800	1.4	6.0	0.8	150				
1N3989	S	MR1130	MR1120	G	900	1.4	6.0	0.7	150				
1N3990	S	MR1130	MR1120	G	1000	1.4	6.0	0.6	150				
1N3991	G			S	35	0.55	30m	1.0m	1.0				
1N3992	S			S	4000	5.0	250m	5.0*					
★1N3993	S		1N3993	Z						3.9	640	10	10W
★1N3993A	S		1N3993	Z						3.9	640	5.0	10W
★1N3994	S		1N3993	Z						4.3	580	10	10W
★1N3994A	S		1N3993	Z						4.3	580	5.0	10W
★1N3995	S		1N3993	Z						4.7	530	10	10W
★1N3995A	S		1N3993	Z						4.7	530	5.0	10W
★1N3996	S		1N3993	Z						5.1	490	10	10W
★1N3996A	S		1N3993	Z						5.1	490	5.0	10W
★1N3997	S		1N3993	Z						5.6	445	10	10W
★1N3997A	S		1N3993	Z						5.6	445	5.0	10W
★1N3998	S		1N3993	Z						6.2	405	10	10W
★1N3998A	S		1N3993	Z						6.2	405	5.0	10W
★1N3999	S		1N3993	Z						6.8	370	10	10W
★1N3999A	S		1N3993	Z						6.8	370	5.0	10W
★1N4000	S		1N3993	Z						7.5	335	10	10W
★1N4000A	S		1N3993	Z						7.5	335	5.0	10W
★1N4001	S		1N4001	G	50	1.1	1.0	0.03	30				
★1N4002	S		1N4001	G	100	1.1	1.0	0.03	30				
★1N4003	S		1N4001	G	200	1.1	1.0	0.03	30				
★1N4004	S		1N4001	G	400	1.1	1.0	0.03	30				
★1N4005	S		1N4001	G	600	1.1	1.0	0.03	30				
★1N4006	S		1N4001	G	800	1.1	1.0	0.03	30				
★1N4007	S		1N4001	G	1000	1.1	1.0	0.03	30				
1N4008	G			S	12	0.5	10m	0.1m	70				
1N4009	S			S	25	1.0	30m	0.1m	4.0				
1N4010	S	1N821	1N821	R						6.2	0.01	7.5	25/100
1N4011	S			G	1000	1.1	0.5	0.2	30				
1N4012	S			G	700	1.3	12	1.0	200				
1N4013	S			G	800	1.3	12	1.0	200				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4014	S			G	900	1.3	12	1.0	200				
1N4015	S			G	1000	1.3	12	1.0	200				
1N4016	S	1N2972	1N2970	Z						8.2	150	20	5.0W
1N4016A	S	1N2972A	1N2970	Z						8.2	150	10	5.0W
1N4016B	S	1N2972B	1N2970	Z						8.2	150	5.0	5.0W
1N4017	S	1N2973	1N2970	Z						9.1	135	20	5.0W
1N4017A	S	1N2973A	1N2970	Z						9.1	135	10	5.0W
1N4017B	S	1N2973B	1N2970	Z						9.1	135	5.0	5.0W
1N4018	S	1N2974	1N2970	Z						10	125	20	5.0W
1N4018A	S	1N2974A	1N2970	Z						10	125	10	5.0W
1N4018B	S	1N2974B	1N2970	Z						10	125	5.0	5.0W
1N4019	S	1N2975	1N2970	Z						11	115	20	5.0W
1N4019A	S	1N2975A	1N2970	Z						11	115	10	5.0W
1N4019B	S	1N2975B	1N2970	Z						11	115	5.0	5.0W
1N4020	S	1N2976	1N2970	Z						12	105	20	5.0W
1N4020A	S	1N2976A	1N2970	Z						12	105	10	5.0W
1N4020B	S	1N2976B	1N2970	Z						12	105	5.0	5.0W
1N4021	S	1N2977	1N2970	Z						13	95	20	5.0W
1N4021A	S	1N2977A	1N2970	Z						13	95	10	5.0W
1N4021B	S	1N2977B	1N2970	Z						13	95	5.0	5.0W
1N4022	S	1N2979	1N2970	Z						15	85	20	5.0W
1N4022A	S	1N2979A	1N2970	Z						15	85	10	5.0W
1N4022B	S	1N2979B	1N2970	Z						15	85	5.0	5.0W
1N4023	S	1N2980	1N2970	Z						16	80	20	5.0W
1N4023A	S	1N2980A	1N2970	Z						16	80	10	5.0W
1N4023B	S	1N2980B	1N2970	Z						16	80	5.0	5.0W
1N4024	S	1N2982	1N2970	Z						18	70	20	5.0W
1N4024A	S	1N2982A	1N2970	Z						18	70	10	5.0W
1N4024B	S	1N2982B	1N2970	Z						18	70	5.0	5.0W
1N4025	S	1N2984	1N2970	Z						20	65	20	5.0W
1N4025A	S	1N2984A	1N2970	Z						20	65	10	5.0W
1N4025B	S	1N2984B	1N2970	Z						20	65	5.0	5.0W
1N4026	S	1N2985	1N2970	Z						22	55	20	5.0W
1N4026A	S	1N2985A	1N2970	Z						22	55	10	5.0W
1N4026B	S	1N2985B	1N2970	Z						22	55	5.0	5.0W
1N4027	S	1N2986	1N2970	Z						24	50	20	5.0W
1N4027A	S	1N2986A	1N2970	Z						24	50	10	5.0W
1N4027B	S	1N2986B	1N2970	Z						24	50	5.0	5.0W
1N4028	S	1N2988	1N2970	Z						27	45	20	5.0W
1N4028A	S	1N2988A	1N2970	Z						27	45	10	5.0W
1N4028B	S	1N2988B	1N2970	Z						27	45	5.0	5.0W
1N4029	S	1N2989	1N2970	Z						30	42	20	5.0W
1N4029A	S	1N2989A	1N2970	Z						30	42	10	5.0W
1N4029B	S	1N2989B	1N2970	Z						30	42	5.0	5.0W
1N4030	S	1N2990	1N2970	Z						33	38	20	5.0W
1N4030A	S	1N2990A	1N2970	Z						33	38	10	5.0W
1N4030B	S	1N2990B	1N2970	Z						33	38	5.0	5.0W
1N4031	S	1N2991	1N2970	Z						36	35	20	5.0W
1N4031A	S	1N2991A	1N2970	Z						36	35	10	5.0W
1N4031B	S	1N2992B	1N2970	Z						36	35	5.0	5.0W
1N4032	S	1N2992	1N2970	Z						39	32	20	5.0W
1N4032A	S	1N2992A	1N2970	Z						39	32	10	5.0W
1N4032B	S	1N2992B	1N2970	Z						39	32	5.0	5.0W
1N4033	S	1N2993	1N2970	Z						43	29	20	5.0W
1N4033A	S	1N2993A	1N2970	Z						43	29	10	5.0W
1N4033B	S	1N2993B	1N2970	Z						43	29	5.0	5.0W
1N4034	S	1N2995	1N2970	Z						47	27	20	5.0W
1N4034A	S	1N2995A	1N2970	Z						47	27	10	5.0W
1N4034B	S	1N2995B	1N2970	Z						47	27	5.0	5.0W
1N4035	S	1N2997	1N2970	Z						51	25	20	5.0W
1N4035A	S	1N2997A	1N2970	Z						51	25	10	5.0W
1N4035B	S	1N2997B	1N2970	Z						51	25	5.0	5.0W
1N4036	S	1N2999	1N2970	Z						56	22	20	5.0W
1N4036A	S	1N2999A	1N2970	Z						56	22	10	5.0W
1N4036B	S	1N2999B	1N2970	Z						56	22	5.0	5.0W
1N4037	S	1N3000	1N2970	Z						62	20	20	5.0W
1N4037A	S	1N3000A	1N2970	Z						62	20	10	5.0W
1N4037B	S	1N3000B	1N2970	Z						62	20	5.0	5.0W
1N4038	S	1N3001	1N2970	Z						68	18	20	5.0W
1N4038A	S	1N3001A	1N2970	Z						68	18	10	5.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4038B	S	1N3001B	1N2970	Z						68	18	5.0	5.0W
1N4039	S	1N3002	1N2970	Z						75	17	20	5.0W
1N4039A	S	1N3002A	1N2970	Z						75	17	10	5.0W
1N4039B	S	1N3002B	1N2970	Z						75	17	5.0	5.0W
1N4040	S	1N3003	1N2970	Z						82	15	20	5.0W
1N4040A	S	1N3003A	1N2970	Z						82	15	10	5.0W
1N4040B	S	1N3003B	1N2970	Z						82	15	5.0	5.0W
1N4041	S	1N3004	1N2970	Z						91	14	20	5.0W
1N4041A	S	1N3004A	1N2970	Z						91	14	10	5.0W
1N4041B	S	1N3004B	1N2970	Z						91	14	5.0	5.0W
1N4042	S	1N3005	1N2970	Z						100	13	20	5.0W
1N4042A	S	1N3005A	1N2970	Z						100	13	10	5.0W
1N4042B	S	1N3005B	1N2970	Z						100	13	5.0	5.0W
1N4043	S			S	25	1.0	275	0.1*	2.0				
1N4044	S	MR1230SB	MR1230	G	50	1.35	275	15	5000				
1N4045	S	MR1231SB	MR1230	G	100	1.35	275	15	5000				
1N4046	S	MR1232SB	MR1230	G	150	1.35	275	15	5000				
1N4047	S	MR1233SB	MR1230	G	200	1.35	275	15	5000				
1N4048	S	MR1234SB	MR1230	G	250	1.35	275	15	5000				
1N4049	S	MR1235SB	MR1230	G	300	1.35	275	15	5000				
1N4050	S	MR1237SB	MR1230	G	400	1.35	275	15	5000				
1N4051	S	MR1238SB	MR1230	G	500	1.35	275	15	5000				
1N4052	S	MR1239SB	MR1230	G	600	1.35	275	15	5000				
1N4053	S			G	700	1.35	275	15	5000				
1N4054	S			G	800	1.35	275	15	5000				
1N4055	S			G	900	1.35	275	15	5000				
1N4056	S			G	1000	1.35	275	15	5000				
★1N4057	S		1N429	R						12.4	0.005	10	-55/100
★1N4057A	S		1N429	R						12.4	0.002	10	-55/100
★1N4058	S		1N429	R						14.6	0.005	10	-55/100
★1N4058A	S		1N429	R						14.6	0.002	10	-55/100
★1N4059	S		1N429	R						16.8	0.005	10	-55/100
★1N4059A	S		1N429	R						16.8	0.002	10	-55/100
★1N4060	S		1N429	R						18.5	0.005	10	-55/100
★1N4060A	S		1N429	R						18.5	0.002	10	-55/100
★1N4061	S		1N429	R						21	0.005	10	-55/100
★1N4061A	S		1N429	R						21	0.002	10	-55/100
★1N4062	S		1N429	R						23	0.005	10	-55/100
★1N4062A	S		1N429	R						23	0.002	10	-55/100
★1N4063	S		1N429	R						27	0.005	10	-55/100
★1N4063A	S		1N429	R						27	0.002	10	-55/100
★1N4064	S		1N429	R						30	0.005	10	-55/100
★1N4064A	S		1N429	R						30	0.002	10	-55/100
★1N4065	S		1N429	R						33	0.005	10	-55/100
★1N4065A	S		1N429	R						33	0.002	10	-55/100
★1N4066	S		1N429	R						37	0.005	7.5	-55/100
★1N4066A	S		1N429	R						37	0.002	7.5	-55/100
★1N4067	S		1N429	R						43	0.005	7.5	-55/100
★1N4067A	S		1N429	R						43	0.002	7.5	-55/100
★1N4068	S		1N429	R						47	0.005	7.5	-55/100
★1N4068A	S		1N429	R						47	0.002	7.5	-55/100
★1N4069	S		1N429	R						51	0.005	7.5	-55/100
★1N4069A	S		1N429	R						51	0.002	7.5	-55/100
★1N4070	S		1N429	R						56	0.005	7.5	-55/100
★1N4070A	S		1N429	R						56	0.002	7.5	-55/100
★1N4071	S		1N429	R						62	0.005	7.5	-55/100
★1N4071A	S		1N429	R						62	0.002	7.5	-55/100
★1N4072	S		1N429	R						68	0.005	5.0	-55/100
★1N4072A	S		1N429	R						68	0.002	5.0	-55/100
★1N4073	S		1N429	R						75	0.005	5.0	-55/100
★1N4073A	S		1N429	R						75	0.002	5.0	-55/100
★1N4074	S		1N429	R						82	0.005	5.0	-55/100
★1N4074A	S		1N429	R						82	0.002	5.0	-55/100
★1N4075	S		1N429	R						87	0.005	5.0	-55/100
★1N4075A	S		1N429	R						87	0.002	5.0	-55/100
★1N4076	S		1N429	R						91	0.005	5.0	-55/100
★1N4076A	S		1N429	R						91	0.002	5.0	-55/100
★1N4077	S		1N429	R						100	0.002	5.0	-55/100
★1N4077A	S		1N429	R						100	0.002	5.0	-55/100
★1N4078	S		1N429	R						105	0.005	2.5	-55/100

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N4078A	S		1N429	R						105	0.002	2.5	-55/100
★1N4079	S		1N429	R						110	0.005	2.5	-55/100
★1N4079A	S		1N429	R						110	0.002	2.5	-55/100
★1N4080	S		1N429	R						120	0.005	2.5	-55/100
★1N4080A	S		1N429	R						120	0.002	2.5	-55/100
★1N4081	S		1N429	R						130	0.005	2.5	-55/100
★1N4081A	S		1N429	R						130	0.002	2.5	-55/100
★1N4082	S		1N429	R						140	0.005	25	-55/100
★1N4082A	S		1N429	R						140	0.002	25	-55/100
★1N4083	S		1N429	R						150	0.005	25	-55/100
★1N4083A	S		1N429	R						150	0.002	25	-55/100
★1N4084	S		1N429	R						175	0.005	25	-55/100
★1N4084A	S		1N429	R						175	0.002	25	-55/100
★1N4085	S		1N429	R						200	0.005	25	-55/100
★1N4085A	S		1N429	R						200	0.002	25	-55/100
1N4086	S			S	70	1.0	200m	0.25m	200				
1N4087	S			S	50	0.975	30m	90n	2.5				
1N4088	G			S	30	1.0	100m	0.2m					
1N4089	S			G	400	1.2	400	0.2	75				
1N4090	G			B									
1N4091			Table 3	V									
1N4092	S			S		1.0	5.0m	1.0*					
1N4093	S			S	50	1.0	5.0m	1.0					
1N4094	S	1N2624B	1N2620	R						9.6			
1N4095	S	1N5231A	1N5221	Z						5.0	5.0	10	330m
1N4096	S	1N4763A	1N4728	Z						90	8.0	5.0	3.0W
1N4097	S	1N4764A	1N4728	Z						100	5.0	5.0	3.0W
1N4098	S	1M150ZS5	1N4728	Z						150	5.0	5.0	3.0W
★1N4099	S		1N4099	Z						6.8	0.25	5.0	250m
★1N4100	S		1N4099	Z						7.5	0.25	5.0	250m
★1N4101	S		1N4099	Z						8.2	0.25	5.0	250m
★1N4102	S		1N4099	Z						8.7	0.25	5.0	250m
★1N4103	S		1N4099	Z						9.1	0.25	5.0	250m
★1N4104	S		1N4099	Z						10	0.25	5.0	250m
★1N4105	S		1N4099	Z						11	0.25	5.0	250m
★1N4106	S		1N4099	Z						12	0.25	5.0	250m
★1N4107	S		1N4099	Z						13	0.25	5.0	250m
★1N4108	S		1N4099	Z						14	0.25	5.0	250m
★1N4109	S		1N4099	Z						15	0.25	5.0	250m
★1N4110	S		1N4099	Z						16	0.25	5.0	250m
★1N4111	S		1N4099	Z						17	0.25	5.0	250m
★1N4112	S		1N4099	Z						18	0.25	5.0	250m
★1N4113	S		1N4099	Z						19	0.25	5.0	250m
★1N4114	S		1N4099	Z						20	0.25	5.0	250m
★1N4115	S		1N4099	Z						22	0.25	5.0	250m
★1N4116	S		1N4099	Z						24	0.25	5.0	250m
★1N4117	S		1N4099	Z						25	0.25	5.0	250m
★1N4118	S		1N4099	Z						27	0.25	5.0	250m
★1N4119	S		1N4099	Z						28	0.25	5.0	250m
★1N4120	S		1N4099	Z						30	0.25	5.0	250m
★1N4121	S		1N4099	Z						33	0.25	5.0	250m
★1N4122	S		1N4099	Z						36	0.25	5.0	250m
★1N4123	S		1N4099	Z						39	0.25	5.0	250m
★1N4124	S		1N4099	Z						43	0.25	5.0	250m
★1N4125	S		1N4099	Z						47	0.25	5.0	250m
★1N4126	S		1N4099	Z						51	0.25	5.0	250m
★1N4127	S		1N4099	Z						56	0.25	5.0	250m
★1N4128	S		1N4099	Z						60	0.25	5.0	250m
★1N4129	S		1N4099	Z						62	0.25	5.0	250m
★1N4130	S		1N4099	Z						68	0.25	5.0	250m
★1N4131	S		1N4099	Z						75	0.25	5.0	250m
★1N4132	S		1N4099	Z						82	0.25	5.0	250m
★1N4133	S		1N4099	Z						87	0.25	5.0	250m
★1N4134	S		1N4099	Z						91	0.25	5.0	250m
★1N4135	S		1N4099	Z						100	0.25	5.0	250m
1N4136	S			G	200	1.6	70	16	750				
1N4137	S			G	400	1.6	70	12	750				
1N4138	S			G	600	1.6	70	8.0	750				
1N4139	S	1N4719	1N4719	G	50	1.0	3.0	0.1	300				
1N4140	S	1N4720	1N4719	G	100	1.0	3.0	0.1	300				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4141	S	1N4721	1N4719	G	200	1.0	3.0	0.1	300				
1N4142	S	1N4722	1N4719	G	400	1.0	3.0	0.1	300				
1N4143	S	1N4723	1N4719	G	600	1.0	3.0	0.1	300				
1N4144	S	1N4724	1N4719	G	800	1.0	3.0	0.1	300				
1N4145	S	1N4725	1N4719	G	1000	1.0	3.0	0.1	300				
1N4146	S			G	1200	1.0	3.0	0.1	300				
1N4147	S			S	30	1.0	30m	0.1*	10				
1N4148	S			S	75	1.0	10m	25n	4.0				
1N4149	S			S	75	1.0	10m	25n	4.0				
1N4150	S			S	50	1.0	200m	0.1*	6.0				
1N4151	S			S	50	1.0	50m	50n	2.0				
1N4152	S			S	30	0.88	20m	50n	2.0				
1N4153	S			S	50	0.88	20m	50n	2.0				
1N4154	S			S	25	1.0	30m	0.1*	4.0				
1N4155	S			S	400	1.0	100m	0.1*	10				
1N4156	S			S	20	1.84	0.1	50n					
1N4157	S			S	20	2.66	0.1	50n					
1N4158	S	1N4736	1N4728	Z						6.8	37	20	1.0W
1N4158A	S	1N4736	1N4728	Z						6.8	37	10	1.0W
1N4158B	S	1N4736A	1N4728	Z						6.8	37	5.0	1.0W
1N4159	S	1N4737	1N4728	Z						7.5	34	20	1.0W
1N4159A	S	1N4737	1N4728	Z						7.5	34	10	1.0W
1N4159B	S	1N4737A	1N4728	Z						7.5	34	5.0	1.0W
1N4160	S	1N4738	1N4728	Z						8.2	31	20	1.0W
1N4160A	S	1N4738	1N4728	Z						8.2	31	10	1.0W
1N4160B	S	1N4738A	1N4728	Z						8.2	31	5.0	1.0W
1N4161	S	1N4739	1N4728	Z						9.1	28	20	1.0W
1N4161A	S	1N4739	1N4728	Z						9.1	28	10	1.0W
1N4161B	S	1N4739A	1N4728	Z						9.1	28	5.0	1.0W
1N4162	S	1N4740	1N4728	Z						10	25	20	1.0W
1N4162A	S	1N4740	1N4728	Z						10	25	10	1.0W
1N4162B	S	1N4740A	1N4728	Z						10	25	5.0	1.0W
1N4163	S	1N4741	1N4728	Z						11	23	20	1.0W
1N4163A	S	1N4741	1N4728	Z						11	23	10	1.0W
1N4163B	S	1N4741A	1N4728	Z						11	23	5.0	1.0W
1N4164	S	1N4742	1N4728	Z						12	21	20	1.0W
1N4164A	S	1N4742	1N4728	Z						12	21	10	1.0W
1N4164B	S	1N4742A	1N4728	Z						12	21	5.0	1.0W
1N4165	S	1N4743	1N4728	Z						13	19	20	1.0W
1N4165A	S	1N4743	1N4728	Z						13	19	10	1.0W
1N4165B	S	1N4743A	1N4728	Z						13	19	5.0	1.0W
1N4166	S	1N4744	1N4728	Z						15	17	20	1.0W
1N4166A	S	1N4744	1N4728	Z						15	17	10	1.0W
1N4166B	S	1N4744A	1N4728	Z						15	17	5.0	1.0W
1N4167	S	1N4745	1N4728	Z						16	16	20	1.0W
1N4167A	S	1N4745	1N4728	Z						16	16	10	1.0W
1N4167B	S	1N4745A	1N4728	Z						16	16	5.0	1.0W
1N4168	S	1N4746	1N4728	Z						18	14	20	1.0W
1N4168A	S	1N4746	1N4728	Z						18	14	10	1.0W
1N4168B	S	1N4746A	1N4728	Z						18	14	5.0	1.0W
1N4169	S	1N4747	1N4728	Z						20	13	20	1.0W
1N4169A	S	1N4747	1N4728	Z						20	13	10	1.0W
1N4169B	S	1N4747A	1N4728	Z						20	13	5.0	1.0W
1N4170	S	1N4748	1N4728	Z						22	12	20	1.0W
1N4170A	S	1N4748	1N4728	Z						22	12	10	1.0W
1N4170B	S	1N4748A	1N4728	Z						22	12	5.0	1.0W
1N4171	S	1N4749	1N4728	Z						24	11	20	1.0W
1N4171A	S	1N4749	1N4728	Z						24	11	10	1.0W
1N4171B	S	1N4749A	1N4728	Z						24	11	5.0	1.0W
1N4172	S	1N4750	1N4718	Z						27	9.5	20	1.0W
1N4172A	S	1N4750	1N4728	Z						27	9.5	10	1.0W
1N4172B	S	1N4750A	1N4728	Z						27	9.5	5.0	1.0W
1N4173	S	1N4751	1N4728	Z						30	8.5	20	1.0W
1N4173A	S	1N4751	1N4728	Z						30	8.5	10	1.0W
1N4173B	S	1N4751A	1N4728	Z						30	8.5	5.0	1.0W
1N4174	S	1N4752	1N4728	Z						33	7.5	20	1.0W
1N4174A	S	1N4752	1N4728	Z						33	7.5	10	1.0W
1N4174B	S	1N4752A	1N4728	Z						33	7.5	5.0	1.0W
1N4175	S	1N4753	1N4728	Z						36	7.0	20	1.0W
1N4175A	S	1N4753	1N4728	Z						36	7.0	10	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4175B	S	1N4753A	1N4728	Z						36	7.0	5.0	1.0W
1N4176	S	1N4754	1N4728	Z						39	6.5	20	1.0W
1N4176A	S	1N4754	1N4728	Z						39	6.5	10	1.0W
1N4176B	S	1N4754A	1N4728	Z						39	6.5	5.0	1.0W
1N4177	S	1N4755	1N4728	Z						43	6.0	20	1.0W
1N4177A	S	1N4755	1N4728	Z						43	6.0	10	1.0W
1N4177B	S	1N4755A	1N4728	Z						43	6.0	5.0	1.0W
1N4178	S	1N4756	1N4728	Z						47	5.5	20	1.0W
1N4178A	S	1N4756	1N4728	Z						47	5.5	10	1.0W
1N4178B	S	1N4756A	1N4728	Z						47	5.5	5.0	1.0W
1N4179	S	1N4757	1N4728	Z						51	5.0	20	1.0W
1N4179A	S	1N4757	1N4728	Z						51	5.0	10	1.0W
1N4179B	S	1N4757A	1N4728	Z						51	5.0	5.0	1.0W
1N4180	S	1N4758	1N4728	Z						56	4.5	20	1.0W
1N4180A	S	1N4758	1N4728	Z						56	4.5	10	1.0W
1N4180B	S	1N4758A	1N4728	Z						56	4.5	5.0	1.0W
1N4181	S	1N4759	1N4728	Z						62	4.0	20	1.0W
1N4181A	S	1N4759	1N4728	Z						62	4.0	10	1.0W
1N4181B	S	1N4759A	1N4728	Z						62	4.0	5.0	1.0W
1N4182	S	1N4760	1N4728	Z						68	3.7	20	1.0W
1N4182A	S	1N4760	1N4728	Z						68	3.7	10	1.0W
1N4182B	S	1N4760A	1N4728	Z						68	3.7	5.0	1.0W
1N4183	S	1N4761	1N4728	Z						75	3.3	20	1.0W
1N4183A	S	1N4761	1N4728	Z						75	3.3	10	1.0W
1N4183B	S	1N4761A	1N4728	Z						75	3.3	5.0	1.0W
1N4184	S	1N4762	1N4728	Z						82	3.0	20	1.0W
1N4184A	S	1N4762	1N4728	Z						82	3.0	10	1.0W
1N4184B	S	1N4762A	1N4728	Z						82	3.0	5.0	1.0W
1N4185	S	1N4763	1N4728	Z						91	2.8	20	1.0W
1N4185A	S	1N4763	1N4728	Z						91	2.8	10	1.0W
1N4185B	S	1N4763A	1N4728	Z						91	2.8	5.0	1.0W
1N4186	S	1N4764	1N4728	Z						100	2.5	20	1.0W
1N4186A	S	1N4764	1N4728	Z						100	2.5	10	1.0W
1N4186B	S	1N4764A	1N4728	Z						100	2.5	5.0	1.0W
1N4187	S		1N4728	Z						110	2.3	20	1.0W
1N4187A	S		1N4728	Z						110	2.3	10	1.0W
1N4187B	S		1N4728	Z						110	2.3	5.0	1.0W
1N4188	S		1N4728	Z						120	2.0	20	1.0W
1N4188A	S		1N4728	Z						120	2.0	10	1.0W
1N4188B	S		1N4728	Z						120	2.0	5.0	1.0W
1N4189	S		1N4728	Z						130	1.9	20	1.0W
1N4189A	S		1N4728	Z						130	1.9	10	1.0W
1N4189B	S		1N4728	Z						130	1.9	5.0	1.0W
1N4190	S		1N4728	Z						150	1.7	20	1.0W
1N4190A	S		1N4728	Z						150	1.7	10	1.0W
1N4190B	S		1N4728	Z						150	1.7	5.0	1.0W
1N4191	S		1N4728	Z						160	1.6	20	1.0W
1N4191A	S		1N4728	Z						160	1.6	10	1.0W
1N4191B	S		1N4728	Z						160	1.6	5.0	1.0W
1N4192	S		1N4728	Z						180	1.4	20	1.0W
1N4192A	S		1N4728	Z						180	1.4	10	1.0W
1N4192B	S		1N4728	Z						180	1.4	5.0	1.0W
1N4193	S		1N4728	Z						200	1.2	20	1.0W
1N4193A	S		1N4728	Z						200	1.2	10	1.0W
1N4193B	S		1N4728	Z						200	1.2	5.0	1.0W
1N4194	S	1N2970	1N2970	Z						6.8	370	20	10W
1N4194A	S	1N2970A	1N2970	Z						6.8	370	10	10W
1N4194B	S	1N2970B	1N2970	Z						6.8	370	5.0	10W
1N4195	S	1N2971	1N2970	Z						7.5	335	20	10W
1N4195A	S	1N2971A	1N2970	Z						7.5	335	10	10W
1N4195B	S	1N2971B	1N2970	Z						7.5	335	5.0	10W
1N4196	S	1N2972	1N2970	Z						8.2	305	20	10W
1N4196A	S	1N2972A	1N2970	Z						8.2	305	10	10W
1N4196B	S	1N2972B	1N2970	Z						8.2	305	5.0	10W
1N4197	S	1N2973	1N2970	Z						9.1	275	20	10W
1N4197A	S	1N2973A	1N2970	Z						9.1	275	10	10W
1N4197B	S	1N2973B	1N2970	Z						9.1	275	5.0	10W
1N4198	S	1N2974	1N2970	Z						10	250	20	10W
1N4198A	S	1N2974A	1N2970	Z						10	250	10	10W
1N4198B	S	1N2974B	1N2970	Z						10	250	5.0	10W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4199	S	1N2975	1N2970	Z						11	230	20	10W
1N4199A	S	1N2975A	1N2970	Z						11	230	10	10W
1N4199B	S	1N2975B	1N2970	Z						11	230	5.0	10W
1N4200	S	1N2976	1N2970	Z						12	210	20	10W
1N4200A	S	1N2976A	1N2970	Z						12	210	10	10W
1N4200B	S	1N2976B	1N2970	Z						12	210	5.0	10W
1N4201	S	1N2977	1N2970	Z						13	190	20	10W
1N4201A	S	1N2977A	1N2970	Z						13	190	10	10W
1N4201B	S	1N2977B	1N2970	Z						13	190	5.0	10W
1N4202	S	1N2978	1N2970	Z						14	180	20	10W
1N4202A	S	1N2978A	1N2970	Z						14	180	10	10W
1N4202B	S	1N2978B	1N2970	Z						14	180	5.0	10W
1N4203	S	1N2979	1N2970	Z						15	170	20	10W
1N4203A	S	1N2979A	1N2970	Z						15	170	10	10W
1N4203B	S	1N2979B	1N2970	Z						15	170	5.0	10W
1N4204	S	1N2980	1N2970	Z						16	155	20	10W
1N4204A	S	1N2980A	1N2970	Z						16	155	10	10W
1N4204B	S	1N2980B	1N2970	Z						16	155	5.0	10W
1N4205	S	1N2981	1N2970	Z						17	145	20	10W
1N4205A	S	1N2981A	1N2970	Z						17	145	10	10W
1N4205B	S	1N2981B	1N2970	Z						17	145	5.0	10W
1N4206	S	1N2982	1N2970	Z						18	140	20	10W
1N4206A	S	1N2982A	1N2970	Z						18	140	10	10W
1N4206B	S	1N2982B	1N2970	Z						18	140	5.0	10W
1N4207	S	1N2983	1N2970	Z						19	130	20	10W
1N4207A	S	1N2983A	1N2970	Z						19	130	10	10W
1N4207B	S	1N2983B	1N2970	Z						19	130	5.0	10W
1N4208	S	1N2984	1N2970	Z						20	125	20	10W
1N4208A	S	1N2984A	1N2970	Z						20	125	10	10W
1N4208B	S	1N2984B	1N2970	Z						20	125	5.0	10W
1N4209	S	1N2985	1N2970	Z						22	115	20	10W
1N4209A	S	1N2985A	1N2970	Z						22	115	10	10W
1N4209B	S	1N2985B	1N2970	Z						22	115	5.0	10W
1N4210	S	1N2986	1N2970	Z						24	105	20	10W
1N4210A	S	1N2986A	1N2970	Z						24	105	10	10W
1N4210B	S	1N2986B	1N2970	Z						24	105	5.0	10W
1N4211	S	1N2987	1N2970	Z						25	100	20	10W
1N4211A	S	1N2987A	1N2970	Z						25	100	10	10W
1N4211B	S	1N2987B	1N2970	Z						25	100	5.0	10W
1N4212	S	1N2988	1N2970	Z						27	95	20	10W
1N4212A	S	1N2988A	1N2970	Z						27	95	10	10W
1N4212B	S	1N2988B	1N2970	Z						27	95	5.0	10W
1N4213	S	1N2989	1N2970	Z						30	85	20	10W
1N4213A	S	1N2989A	1N2970	Z						30	85	10	10W
1N4213B	S	1N2989B	1N2970	Z						30	85	5.0	10W
1N4214	S	1N2990	1N2970	Z						33	75	20	10W
1N4214A	S	1N2990A	1N2970	Z						33	75	10	10W
1N4214B	S	1N2990B	1N2970	Z						33	75	5.0	10W
1N4215	S	1N2991	1N2970	Z						36	70	20	10W
1N4215A	S	1N2991A	1N2970	Z						36	70	10	10W
1N4215B	S	1N2991B	1N2970	Z						36	70	5.0	10W
1N4216	S	1N2992	1N2970	Z						39	65	20	10W
1N4216A	S	1N2992A	1N2970	Z						39	65	10	10W
1N4216B	S	1N2992B	1N2970	Z						39	65	5.0	10W
1N4217	S	1N2993	1N2970	Z						43	60	20	10W
1N4217A	S	1N2993A	1N2970	Z						43	60	10	10W
1N4217B	S	1N2993B	1N2970	Z						43	60	5.0	10W
1N4218	S	1N2994	1N2970	Z						45	55	20	10W
1N4218A	S	1N2994A	1N2970	Z						45	55	10	10W
1N4218B	S	1N2994B	1N2970	Z						45	55	5.0	10W
1N4219	S	1N2995	1N2970	Z						47	55	20	10W
1N4219A	S	1N2995A	1N2970	Z						47	55	10	10W
1N4219B	S	1N2995B	1N2970	Z						47	55	5.0	10W
1N4220	S	1N2996	1N2970	Z						50	50	20	10W
1N4220A	S	1N2996A	1N2970	Z						50	50	10	10W
1N4220B	S	1N2996B	1N2970	Z						50	50	5.0	10W
1N4221	S	1N2997	1N2970	Z						51	50	20	10W
1N4221A	S	1N2997A	1N2970	Z						51	50	10	10W
1N4221B	S	1N2997B	1N2970	Z						51	50	5.0	10W
1N4222	S	1N2998	1N2970	Z						52	50	20	10W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4222A	S	1N2998A	1N2970	Z						52	50	10	10W
1N4222B	S	1N2998B	1N2970	Z						52	50	5.0	10W
1N4223	S	1N2999	1N2970	Z						56	45	20	10W
1N4223A	S	1N2999A	1N2970	Z						56	45	10	10W
1N4223B	S	1N2999B	1N2970	Z						56	45	5.0	10W
1N4224	S	1N3000	1N2970	Z						62	40	20	10W
1N4224A	S	1N3000A	1N2970	Z						62	40	10	10W
1N4224B	S	1N3000B	1N2970	Z						62	40	5.0	10W
1N4225	S	1N3001	1N2970	Z						68	37	20	10W
1N4225A	S	1N3001A	1N2970	Z						68	37	10	10W
1N4225B	S	1N3001B	1N2970	Z						68	37	5.0	10W
1N4226	S	1N3002	1N2970	Z						75	33	20	10W
1N4226A	S	1N3002A	1N2970	Z						75	33	10	10W
1N4226B	S	1N3002B	1N2970	Z						75	33	5.0	10W
1N4227	S	1N3003	1N2970	Z						82	30	20	10W
1N4227A	S	1N3003A	1N2970	Z						82	30	10	10W
1N4227B	S	1N3003B	1N2970	Z						82	30	5.0	10W
1N4228	S	1N3004	1N2970	Z						91	28	20	10W
1N4228A	S	1N3004A	1N2970	Z						91	28	10	10W
1N4228B	S	1N3004B	1N2970	Z						91	28	5.0	10W
1N4229	S	1N3005	1N2970	Z						100	25	20	10W
1N4229A	S	1N3005A	1N2970	Z						100	25	10	10W
1N4229B	S	1N3005B	1N2970	Z						100	25	5.0	10W
1N4230	S	1N3006	1N2970	Z						105	25	20	10W
1N4230A	S	1N3006A	1N2970	Z						105	25	10	10W
1N4230B	S	1N3006B	1N2970	Z						105	25	5.0	10W
1N4231	S	1N3007	1N2970	Z						110	23	20	10W
1N4231A	S	1N3007A	1N2970	Z						110	23	10	10W
1N4231B	S	1N3007B	1N2970	Z						110	23	5.0	10W
1N4232	S	1N3008	1N2970	Z						120	20	20	10W
1N4232A	S	1N3008A	1N2970	Z						120	20	10	10W
1N4232B	S	1N3008B	1N2970	Z						120	20	5.0	10W
1N4233	S	1N3009	1N2970	Z						130	19	20	10W
1N4233A	S	1N3009A	1N2970	Z						130	19	10	10W
1N4233B	S	1N3009B	1N2970	Z						130	19	5.0	10W
1N4234	S	1N3010	1N2970	Z						140	18	20	10W
1N4234A	S	1N3010A	1N2970	Z						140	18	10	10W
1N4234B	S	1N3010B	1N2970	Z						140	18	5.0	10W
1N4235	S	1N3011	1N2970	Z						150	17	20	10W
1N4235A	S	1N3011A	1N2970	Z						150	17	10	10W
1N4235B	S	1N3011B	1N2970	Z						150	17	5.0	10W
1N4236	S	1N3012	1N2970	Z						160	16	20	10W
1N4236A	S	1N3012A	1N2970	Z						160	16	10	10W
1N4236B	S	1N3012B	1N2970	Z						160	16	5.0	10W
1N4237	S	1N3013	1N2970	Z						175	14	20	10W
1N4237A	S	1N3013A	1N2970	Z						175	14	10	10W
1N4237B	S	1N3013B	1N2970	Z						175	14	5.0	10W
1N4238	S	1N3014	1N2970	Z						180	14	20	10W
1N4238A	S	1N3014A	1N2970	Z						180	14	10	10W
1N4238B	S	1N3014B	1N2970	Z						180	14	5.0	10W
1N4239	S	1N3015	1N2970	Z						200	12	20	10W
1N4239A	S	1N3015A	1N2970	Z						200	12	10	10W
1N4239B	S	1N3015B	1N2970	Z						200	12	5.0	10W
1N4240	S			Z						400	5.0	2.0	10W
1N4241	S			Z						350	6.0	2.0	10W
1N4242	S			S	40	1.0	20m	0.1n	2.0				
1N4243	S			S	40	1.0	10m	0.1n	2.0				
1N4244	S			S	10	1.0	20m	0.1*	0.75				
1N4245	S	1N4003	1N4001	G	**200**	**1.64**	**1.0**	**0.05**	**25**				
1N4246	S	1N4004	1N4001	G	**400**	**1.64**	**1.0**	**0.05**	**25**				
1N4247	S	1N4005	1N4001	G	**600**	**1.64**	**1.0**	**0.05**	**25**				
1N4248	S	1N4006	1N4001	G	**800**	**1.64**	**1.0**	**0.05**	**25**				
1N4249	S	1N4007	1N4001	G	**1000**	**1.64**	**1.0**	**0.05**	**25**				
1N4250	S	1N4006	1N4001	G	**800**		**0.5**	**0.05**	**10**				
1N4251	S	1N4007	1N4001	G	**1000**		**0.5**	**0.05**	**10**				
1N4252	S	MR1-1200	MR1-1200	G	**1200**		**0.5**	**0.05**	**10**				
1N4253	S	MR1-1600	MR1-1200	G	**1500**		**0.5**	**0.05**	**10**				
1N4254	S	MR991A	MR990A	G	**1500**	**4.8**	**0.25**	**0.05**	**6.25**				
1N4255	S	MR992A	MR990A	G	**2000**	**4.8**	**0.25**	**0.05**	**6.25**				
1N4256	S	MR993A	MR990A	G	**2500**	**4.8**	**0.25**	**0.05**	**6.25**				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4257	S	MR994A	MR990A	G	3000	4.8	0.25	0.05	6.25				
1N4258	S	1N2970	1N2970	Z						6.8	370	20	10W
1N4258A	S	1N2970A	1N2970	Z						6.8	370	10	10W
1N4258B	S	1N2970B	1N2970	Z						6.8	370	5.0	10W
1N4259	S	1N2971	1N2970	Z						7.5	335	20	10W
1N4259A	S	1N2971A	1N2970	Z						7.5	335	10	10W
1N4259B	S	1N2971B	1N2970	Z						7.5	335	5.0	10W
1N4260	S	1N2972	1N2970	Z						8.2	305	20	10W
1N4260A	S	1N2972A	1N2970	Z						8.2	305	10	10W
1N4260B	S	1N2972B	1N2970	Z						8.2	305	5.0	10W
1N4261	S	1N2973	1N2970	Z						9.1	275	20	10W
1N4261A	S	1N2973A	1N2970	Z						9.1	275	10	10W
1N4261B	S	1N2973B	1N2970	Z						9.1	275	5.0	10W
1N4262	S	1N2974	1N2970	Z						10	250	20	10W
1N4262A	S	1N2974A	1N2970	Z						10	250	10	10W
1N4262B	S	1N2974B	1N2970	Z						10	250	5.0	10W
1N4263	S	1N2975	1N2970	Z						11	230	20	10W
1N4263A	S	1N2975A	1N2970	Z						11	230	10	10W
1N4263B	S	1N2975B	1N2970	Z						11	230	5.0	10W
1N4264	S	1N2976	1N2970	Z						12	210	20	10W
1N4264A	S	1N2976A	1N2970	Z						12	210	10	10W
1N4264B	S	1N2976B	1N2970	Z						12	210	5.0	10W
1N4265	S	1N2977	1N2970	Z						13	190	20	10W
1N4265A	S	1N2977A	1N2970	Z						13	190	10	10W
1N4265B	S	1N2977B	1N2970	Z						13	190	5.0	10W
1N4266	S	1N2979	1N2970	Z						15	170	20	10W
1N4266A	S	1N2979A	1N2970	Z						15	170	10	10W
1N4266B	S	1N2979B	1N2970	Z						15	170	5.0	10W
1N4267	S	1N2980	1N2970	Z						16	155	20	10W
1N4267A	S	1N2980A	1N2970	Z						16	155	10	10W
1N4267B	S	1N2980B	1N2970	Z						16	155	5.0	10W
1N4268	S	1N2982	1N2970	Z						18	140	20	10W
1N4268A	S	1N2982A	1N2970	Z						18	140	10	10W
1N4268B	S	1N2982B	1N2970	Z						18	140	5.0	10W
1N4269	S	1N2984	1N2970	Z						20	125	20	10W
1N4269A	S	1N2984A	1N2970	Z						20	125	10	10W
1N4269B	S	1N2984B	1N2970	Z						20	125	5.0	10W
1N4270	S	1N2985	1N2979	Z						22	115	20	10W
1N4270A	S	1N2985A	1N2970	Z						22	115	10	10W
1N4270B	S	1N2985B	1N2970	Z						22	115	5.0	10W
1N4271	S	1N2986	1N2970	Z						24	105	20	10W
1N4271A	S	1N2986A	1N2970	Z						24	105	10	10W
1N4271B	S	1N2986B	1N2970	Z						24	105	5.0	10W
1N4272	S	1N2988	1N2970	Z						27	95	20	10W
1N4272A	S	1N2988A	1N2970	Z						27	95	10	10W
1N4272B	S	1N2988B	1N2970	Z						27	95	5.0	10W
1N4273	S	1N2989	1N2970	Z						30	85	20	10W
1N4273A	S	1N2989A	1N2970	Z						30	85	10	10W
1N4273B	S	1N2989B	1N2970	Z						30	85	5.0	10W
1N4274	S	1N2990	1N2970	Z						33	75	20	10W
1N4274A	S	1N2990A	1N2970	Z						33	75	10	10W
1N4274B	S	1N2990B	1N2970	Z						33	75	5.0	10W
1N4275	S	1N2991	1N2970	Z						36	70	20	10W
1N4275A	S	1N2991A	1N2970	Z						36	70	10	10W
1N4275B	S	1N2991B	1N2970	Z						36	70	5.0	10W
1N4276	S	1N2992	1N2970	Z						39	65	20	10W
1N4276A	S	1N2992A	1N2970	Z						39	65	10	10W
1N4276B	S	1N2992B	1N2970	Z						39	65	5.0	10W
1N4277	S	1N2993	1N2970	Z						43	60	20	10W
1N4277A	S	1N2993A	1N2970	Z						43	60	10	10W
1N4277B	S	1N2993B	1N2970	Z						43	60	5.0	10W
1N4278	S	1N2995	1N2970	Z						47	55	20	10W
1N4278A	S	1N2995A	1N2970	Z						47	55	10	10W
1N4278B	S	1N2995B	1N2970	Z						47	55	5.0	10W
1N4279	S	1N2997	1N2970	Z						51	55	20	10W
1N4279A	S	1N2997A	1N2970	Z						51	55	10	10W
1N4279B	S	1N2997B	1N2970	Z						51	55	5.0	10W
1N4280	S	1N2999	1N2970	Z						56	45	20	10W
1N4280A	S	1N2999A	1N2970	Z						56	45	10	10W
1N4280B	S	1N2999B	1N2970	Z						56	45	5.0	10W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts	@ I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4281	S	1N3000	1N2970	Z						62	40	20	10W
1N4281A	S	1N3000A	1N2970	Z						62	40	10	10W
1N4281B	S	1N3000B	1N2970	Z						62	40	5.0	10W
1N4282	S	1N3001	1N2970	Z						68	37	20	10W
1N4282A	S	1N3001A	1N2970	Z						68	37	10	10W
1N4282B	S	1N3001B	1N2970	Z						68	37	5.0	10W
1N4283	S	1N3002	1N2970	Z						75	33	20	10W
1N4283A	S	1N3002A	1N2970	Z						75	33	10	10W
1N4283B	S	1N3002B	1N2970	Z						75	33	5.0	10W
1N4284	S	1N3003	1N2970	Z						82	30	20	10W
1N4284A	S	1N3003A	1N2970	Z						82	30	10	10W
1N4284B	S	1N3003B	1N2970	Z						82	30	5.0	10W
1N4285	S	1N3004	1N2970	Z						91	28	20	10W
1N4285A	S	1N3004A	1N2970	Z						91	28	10	10W
1N4285B	S	1N3004B	1N2970	Z						91	28	5.0	10W
1N4286	S	1N3005	1N2970	Z						100	25	20	10W
1N4286A	S	1N3005A	1N2970	Z						100	25	10	10W
1N4286B	S	1N3005B	1N2970	Z						100	25	5.0	10W
1N4287	S	1N3007	1N2970	Z						110	23	20	10W
1N4287A	S	1N3007A	1N2970	Z						110	23	10	10W
1N4287B	S	1N3007B	1N2970	Z						110	23	5.0	10W
1N4288	S	1N3008	1N2970	Z						120	20	20	10W
1N4288A	S	1N3008A	1N2970	Z						120	20	10	10W
1N4288B	S	1N3008B	1N2970	Z						120	20	5.0	10W
1N4289	S	1N3009	1N2970	Z						130	19	20	10W
1N4289A	S	1N3009A	1N2970	Z						130	19	10	10W
1N4289B	S	1N3009B	1N2970	Z						130	19	5.0	10W
1N4290	S	1N3011	1N2970	Z						150	17	20	10W
1N4290A	S	1N3011A	1N2970	Z						150	17	10	10W
1N4290B	S	1N3011B	1N2970	Z						150	17	5.0	10W
1N4291	S	1N3012	1N2970	Z						160	16	20	10W
1N4291A	S	1N3012A	1N2970	Z						160	16	10	10W
1N4291B	S	1N3012B	1N2970	Z						160	16	5.0	10W
1N4292	S	1N3014	1N2970	Z						180	14	20	10W
1N4292A	S	1N3014A	1N2970	Z						180	14	10	10W
1N4292B	S	1N3014B	1N2970	Z						180	14	5.0	10W
1N4293	S	1N3015	1N2970	Z						200	12	20	10W
1N4293A	S	1N3015A	1N2970	Z						200	12	10	10W
1N4293B	S	1N3015B	1N2970	Z						200	12	5.0	10W
1N4294	S		Table 4	M									
1N4295	S			R						10	0.012	10	-55/150
1N4295A	S			R						10	0.012	10	-55/150
1N4296	S			R						10	0.012	20	-55/150
1N4296A	S			R						10	0.012	20	-55/150
1N4297	S			R						8.8	0.01	200	0/75
1N4297A	S			R						8.8	0.01	200	-55/100
1N4297B	S			R						8.8	0.01	200	-55/150
1N4298	S			R						8.8	0.005	200	0/75
1N4298A	S			R						8.8	0.005	200	-55/100
1N4298B	S			R						8.8	0.005	200	-55/150
1N4299	S			R						11.3	0.01	150	0/75
1N4299A	S			R						11.3	0.01	150	-55/100
1N4299B	S			R						11.3	0.01	150	-55/150
1N4300	S			R						11.3	0.01	150	0/75
1N4300A	S			R						11.3	0.005	150	-55/100
1N4300B	S			R						11.3	0.005	150	-55/150
1N4301	S			R						8.8	0.005	1000	0/50
1N4301A	S			R						8.8	0.01	1000	-55/50
1N4301B	S			R						8.8	0.01	1000	-55/50
1N4302	S			R						8.8	0.01	1000	0/50
1N4302A	S			R						8.8	0.005	1000	-55/100
1N4302B	S			R						8.8	0.005	1000	-55/150
1N4303	S			R						11.3	0.005	1000	0/75
1N4303A	S			R						11.3	0.01	750	-55/50
1N4303B	S			R						11.3	0.01	750	-55/50
1N4304	S			R						11.3	0.005	750	0/50
1N4304A	S			R						11.3	0.005	750	-55/50
1N4304B	S			R						11.3	0.005	750	-55/50
1N4305				S	75	0.575	0.25m	0.1*	2.0				
1N4306	S			S	50	1.0	50m	50n	2.0				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4307	S			S	50	1.0	50m	50n	2.0				
1N4308	S			S	80	1.0	200m	0.1*	2.0				
1N4309	S			S	40	1.0	400m	0.1*	2.0				
1N4310	S			S	60	1.0	400m	0.1*	2.0				
1N4311	S			S	80	1.0	300m	0.1*	2.0				
1N4312	S			S	120	1.0	200m	0.1*	2.0				
1N4313	S			S	80	1.0	100m	0.1*	4.0				
1N4314	S			S	80	1.0	200m	0.1*	2.0				
1N4315	S			S	40	1.0	400m	0.1*	2.0				
1N4316	S			S	60	1.0	400m	0.1*	2.0				
1N4317	S			S	80	1.0	300m	0.1*	2.0				
1N4318	S			S	120	1.0	200m	0.1*	2.0				
1N4319	S			S	80	1.0	100m	0.1*	4.0				
1N4320	S			S	640			1.0*					
1N4321	S	5M50ZS10	1N4728	Z						50	15	10	3.0W
1N4322	S			S	50	1.0	0.2	0.1*	6.0				
1N4323	S	1N4736	1N4728	Z						6.8	37	20	1.0W
1N4323A	S	1N4736	1N4728	Z						6.8	37	10	1.0W
1N4323B	S	1N4736A	1N4728	Z						6.8	37	5.0	1.0W
1N4324	S	1N4737	1N4728	Z						7.5	34	20	1.0W
1N4324A	S	1N4737	1N4728	Z						7.5	34	10	1.0W
1N4324B	S	1N4737A	1N4728	Z						7.5	34	5.0	1.0W
1N4325	S	1N4738	1N4728	Z						8.2	31	20	1.0W
1N4325A	S	1N4738	1N4728	Z						8.2	31	10	1.0W
1N4325B	S	1N4738A	1N4728	Z						8.2	31	5.0	1.0W
1N4326	S	1N4739	1N4728	Z						9.1	28	20	1.0W
1N4326A	S	1N4739	1N4728	Z						9.1	28	10	1.0W
1N4326B	S	1N4739A	1N4728	Z						9.1	28	5.0	1.0W
1N4327	S	1N4740	1N4728	Z						10	25	20	1.0W
1N4327A	S	1N4740	1N4728	Z						10	25	10	1.0W
1N4327B	S	1N4740A	1N4728	Z						10	25	5.0	1.0W
1N4328	S	1N4741	1N4728	Z						11	23	20	1.0W
1N4328A	S	1N4741	1N4728	Z						11	23	10	1.0W
1N4328B	S	1N4741A	1N4728	Z						11	23	5.0	1.0W
1N4329	S	1N4742	1N4728	Z						12	21	20	1.0W
1N4329A	S	1N4742	1N4728	Z						12	21	10	1.0W
1N4329B	S	1N4742A	1N4728	Z						12	21	5.0	1.0W
1N4330	S	1N4743	1N4728	Z						13	19	20	1.0W
1N4330A	S	1N4743	1N4728	Z						13	19	10	1.0W
1N4330B	S	1N4743A	1N4728	Z						13	19	5.0	1.0W
1N4331	S	1N4744	1N4728	Z						15	17	20	1.0W
1N4331A	S	1N4744	1N4728	Z						15	17	10	1.0W
1N4331B	S	1N4744A	1N4728	Z						15	17	5.0	1.0W
1N4332	S	1N4745	1N4728	Z						16	16	20	1.0W
1N4332A	S	1N4745	1N4728	Z						16	16	10	1.0W
1N4332B	S	1N4745A	1N4728	Z						16	16	5.0	1.0W
1N4333	S	1N4746	1N4728	Z						18	14	20	1.0W
1N4333A	S	1N4746	1N4728	Z						18	14	10	1.0W
1N4333B	S	1N4746A	1N4728	Z						18	14	5.0	1.0W
1N4334	S	1N4747	1N4728	Z						20	13	20	1.0W
1N4334A	S	1N4747	1N4728	Z						20	13	10	1.0W
1N4334B	S	1N4747A	1N4728	Z						20	13	5.0	1.0W
1N4335	S	1N4748	1N4728	Z						22	12	20	1.0W
1N4335A	S	1N4748	1N4728	Z						22	12	10	1.0W
1N4335B	S	1N4748A	1N4728	Z						22	12	5.0	1.0W
1N4336	S	1N4749	1N4728	Z						24	11	20	1.0W
1N4336A	S	1N4749	1N4728	Z						24	11	10	1.0W
1N4336B	S	1N4749A	1N4728	Z						24	11	5.0	1.0W
1N4337	S	1N4750	1N4728	Z						27	9.5	20	1.0W
1N4337A	S	1N4750	1N4728	Z						27	9.5	10	1.0W
1N4337B	S	1N4750A	1N4728	Z						27	9.5	5.0	1.0W
1N4338	S	1N4751	1N4728	Z						30	8.5	20	1.0W
1N4338A	S	1N4751	1N4728	Z						30	8.5	10	1.0W
1N4338B	S	1N4751A	1N4728	Z						30	8.5	5.0	1.0W
1N4339	S	1N4752	1N4728	Z						33	7.5	20	1.0W
1N4339A	S	1N4752	1N4728	Z						33	7.5	10	1.0W
1N4339B	S	1N4752A	1N4728	Z						33	7.5	5.0	1.0W
1N4340	S	1N4753	1N4728	Z						36	7.0	20	1.0W
1N4340A	S	1N4753	1N4728	Z						36	7.0	10	1.0W
1N4340B	S	1N4753A	1N4728	Z						36	7.0	5.0	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts	@ I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4341	S	1N4754	1N4728	Z						39	6.5	20	1.0W
1N4341A	S	1N4754	1N4728	Z						39	6.5	10	1.0W
1N4341B	S	1N4754A	1N4728	Z						39	6.5	5.0	1.0W
1N4342	S	1N4755	1N4728	Z						43	6.0	20	1.0W
1N4342A	S	1N4755	1N4728	Z						43	6.0	10	1.0W
1N4342B	S	1N4755A	1N4728	Z						43	6.0	5.0	1.0W
1N4343	S	1N4756	1N4728	Z						47	5.5	20	1.0W
1N4343A	S	1N4756	1N4728	Z						47	5.5	10	1.0W
1N4343B	S	1N4756A	1N4728	Z						47	5.5	5.0	1.0W
1N4344	S	1N4757	1N4728	Z						51	5.0	20	1.0W
1N4344A	S	1N4757	1N4728	Z						51	5.0	10	1.0W
1N4344B	S	1N4757A	1N4728	Z						51	5.0	5.0	1.0W
1N4345	S	1N4758	1N4728	Z						56	4.5	20	1.0W
1N4345A	S	1N4758	1N4728	Z						56	4.5	10	1.0W
1N4345B	S	1N4758A	1N4728	Z						56	4.5	5.0	1.0W
1N4346	S	1N4759	1N4728	Z						62	4.0	20	1.0W
1N4346A	S	1N4759	1N4728	Z						62	4.0	10	1.0W
1N4346B	S	1N4759A	1N4728	Z						62	4.0	5.0	1.0W
1N4347	S	1N4760	1N4728	Z						68	3.7	20	1.0W
1N4347A	S	1N4760	1N4728	Z						68	3.7	10	1.0W
1N4347B	S	1N4760A	1N4728	Z						68	3.7	5.0	1.0W
1N4348	S	1N4761	1N4728	Z						75	3.3	20	1.0W
1N4348A	S	1N4761	1N4728	Z						75	3.3	10	1.0W
1N4348B	S	1N4761A	1N4728	Z						75	3.3	5.0	1.0W
1N4349	S	1N4762	1N4728	Z						82	3.0	20	1.0W
1N4349A	S	1N4762	1N4728	Z						82	3.0	10	1.0W
1N4349B	S	1N4762A	1N4728	Z						82	3.0	5.0	1.0W
1N4350	S	1N4763	1N4728	Z						91	2.8	20	1.0W
1N4350A	S	1N4763	1N4728	Z						91	2.8	10	1.0W
1N4350B	S	1N4763A	1N4728	Z						91	2.8	5.0	1.0W
1N4351	S	1N4764	1N4728	Z						100	2.5	20	1.0W
1N4351A	S	1N4764	1N4728	Z						100	2.5	10	1.0W
1N4351B	S	1N4764A	1N4728	Z						100	2.5	5.0	1.0W
1N4352	S	1M110ZS10	1N4728	Z						110	2.3	20	1.0W
1N4352A	S	1M110ZS10	1N4728	Z						110	2.3	10	1.0W
1N4352B	S	1M110ZS5	1N4728	Z						110	2.3	5.0	1.0W
1N4353	S	1M120ZS10	1N4728	Z						120	2.0	20	1.0W
1N4353A	S	1N120ZS10	1N4728	Z						120	2.0	10	1.0W
1N4353B	S	1M120ZS5	1N4728	Z						120	2.0	5.0	1.0W
1N4354	S	1M130ZS10	1N4728	Z						130	1.9	20	1.0W
1N4354A	S	1M130ZS10	1N4728	Z						130	1.9	10	1.0W
1N4354B	S	1M130ZS5	1N4728	Z						130	1.9	5.0	1.0W
1N4355	S	1M150ZS10	1N4728	Z						150	1.7	20	1.0W
1N4355A	S	1M150ZS10	1N4728	Z						150	1.7	10	1.0W
1N4355B	S	1M150ZS5	1N4728	Z						150	1.7	5.0	1.0W
1N4356	S	1M160ZS10	1N4728	Z						160	1.6	20	1.0W
1N4356A	S	1M160ZS10	1N4728	Z						160	1.6	10	1.0W
1N4356B	S	1M160ZS5	1N4728	Z						160	1.6	5.0	1.0W
1N4357	S	1M180ZS10	1N4728	Z						180	1.4	20	1.0W
1N4357A	S	1M180ZS10	1N4728	Z						180	1.4	10	1.0W
1N4357B	S	1M180ZS5	1N4728	Z						180	1.4	5.0	1.0W
1N4358	S	1M200ZS10	1N4728	Z						200	1.2	20	1.0W
1N4358A	S	1M200ZS10	1N4728	Z						200	1.2	10	1.0W
1N4358B	S	1M200ZS5	1N4728	Z						200	1.2	5.0	1.0W
1N4359	S			S	200								
1N4360	S	1N4370A	1N746	Z						2.4	10	5.0	0.25W
1N4361	S	1N4007	1N4001	G	900	1.3	0.5	0.5	20				
1N4362	S			S	100	0.9	0.1	10n					
1N4363	S			S	120	1.0	0.2	0.1*	40				
1N4364	S	1N4002	1N4001	G	100	1.5	0.75	0.1	20				
1N4365	S	1N4003	1N4001	G	200	1.5	0.75	0.1	20				
1N4366	S	1N4004	1N4001	G	300	1.5	0.75	0.1	20				
1N4367	S	1N4004	1N4001	G	400	1.5	0.75	0.1	20				
1N4368	S	1N4005	1N4001	G	500	1.5	0.75	0.1	20				
1N4369	S	1N4005	1N4001	G	600	1.5	0.75	0.1	20				
★1N4370	S		1N746	Z						2.4	20	10	0.4W
★1N4370A	S		1N746	Z						2.4	20	5.0	0.4W
★1N4371	S		1N746	Z						2.7	20	10	0.4W
★1N4371A	S		1N746	Z						2.7	20	5.0	0.4W
★1N4372	S		1N746	Z						3.0	20	10	0.4W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N4372A	S		1N746	Z						3.0	20	5.0	0.4W
1N4373	S			S	80	1.0	10m	5.0*	4.0				
1N4374	S	MR991A	MR990A	G	**1500**	**1.75**	**0.75**	**0.1**	**15**				
1N4375	S			S	50	1.0	20m	10n	6.0				
1N4376	S			S	10	1.1	50m	0.1*	0.75				
1N4377	S			G	**25k**	**30**	**0.75**	**0.1**	**50**				
1N4378	S			D									
1N4379	S		Table 4	M									
1N4380	S			S	50	1.4	570m	50n	1.8				
1N4381	G			S	25	0.35	2.0m	0.1m	0.1				
1N4382	S			S	55	1.0	0.3	0.1*	6.5				
1N4383	S	1N4003	1N4001	G	**200**	**1.3**	**1.0**	**0.275**	**50**				
1N4384	S	1N4004	1N4001	G	**400**	**1.3**	**1.0**	**0.25**	**50**				
1N4385	S	1N4005	1N4001	G	**600**	**1.3**	**1.0**	**0.225**	**50**				
★1N4387			Table 3	V									
★1N4388			Table 3	V									
1N4389	S			S	5.0	1.0	2.0m	0.1m					
1N4390	S			S	20	1.0	5.0m	0.2*	0.5				
1N4391	S			S	20	1.0	2.0m	0.2*	0.5				
1N4392	S			S	15	1.0	2.0m	1.0*	0.5				
1N4393, A,B thru 1N4399, A,B	S			T T									
1N4400	S	1N4736	1N4728	Z						6.8	37	20	1.0W
1N4401	S	1N4737	1N4728	Z						7.5	34	20	1.0W
1N4402	S	1N4738	1N4728	Z						8.2	31	20	1.0W
1N4403	S	1N4739	1N4728	Z						9.1	28	20	1.0W
1N4404	S	1N4740	1N4728	Z						10	25	20	1.0W
1N4405	S	1N4741	1N4728	Z						11	23	20	1.0W
1N4406	S	1N4742	1N4728	Z						12	21	20	1.0W
1N4407	S	1N4743	1N4728	Z						13	19	20	1.0W
1N4408	S	1N4744	1N4728	Z						15	17	20	1.0W
1N4409	S	1N4745	1N4728	Z						16	19	20	1.0W
1N4410	S	1N4746	1N4728	Z						18	14	20	1.0W
1N4411	S	1N4747	1N4728	Z						20	13	20	1.0W
1N4412	S	1N4748	1N4728	Z						22	12	20	1.0W
1N4413	S	1N4749	1N4728	Z						24	11	20	1.0W
1N4414	S	1N4750	1N4728	Z						27	9.5	20	1.0W
1N4415	S	1N4751	1N4728	Z						30	8.5	20	1.0W
1N4416	S	1N4752	1N4728	Z						33	7.5	20	1.0W
1N4417	S	1N4753	1N4728	Z						36	7.0	20	1.0W
1N4418	S	1N4754	1N4728	Z						39	6.5	20	1.0W
1N4419	S	1N4755	1N4728	Z						43	6.0	20	1.0W
1N4420	S	1N4756	1N4728	Z						47	5.5	20	1.0W
1N4421	S	1N4757	1N4728	Z						51	5.0	20	1.0W
1N4422	S	1N4758	1N4728	Z						56	4.5	20	1.0W
1N4423	S	1N4759	1N4728	Z						62	4.0	20	1.0W
1N4424	S	1N4760	1N4728	Z						68	3.7	20	1.0W
1N4425	S	1N4761	1N4728	Z						75	3.3	20	1.0W
1N4426	S	1N4762	1N4728	Z						82	3.0	20	1.0W
1N4427	S	1N4763	1N4728	Z						91	2.8	20	1.0W
1N4428	S	1N4764	1N4728	Z						100	2.5	20	1.0W
1N4429	S	1M110ZS10	1N4728	Z						110	2.3	20	1.0W
1N4430	S	1M120ZS10	1N4728	Z						120	2.0	20	1.0W
1N4431	S	1M130ZS10	1N4728	Z						130	1.9	20	1.0W
1N4432	S	1M150ZS10	1N4728	Z						150	1.7	20	1.0W
1N4433	S	1M160ZS10	1N4728	Z						160	1.6	20	1.0W
1N4434	S	1M180ZS10	1N4728	Z						180	1.4	20	1.0W
1N4435	S	1M200ZS10	1N4728	Z						200	1.2	20	1.0W
1N4436	S			G	**200**	**1.2**	**10**	**1.0**	**100**				
1N4437	S			G	**400**	**1.2**	**10**	**1.0**	**100**				
1N4438	S			G	**600**	**1.0**	**10**	**1.0**	**100**				
1N4439	S			G	**800**	**1.2**	**10**	**1.0**	**100**				
1N4440	S			G	**1000**	**1.2**	**10**	**1.0**	**100**				
1N4441	S			G	**1500**	**4.0**	**0.025**	**0.001**	**3.0**				
1N4442	S			S	30	1.0	0.1	1.0n	1.0				
1N4443	S			S	50	1.0	0.1	2.0n	0.6				
1N4444	S			S	50	1.0	0.1	50n	7.0				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4445	S			S	100	1.0	0.1	50n	4.0				
1N4446	S			S	75	1.0	20m	25n	4.0				
1N4447	S			S	75	1.0	20m	25n	4.0				
1N4448	S			S	75	0.72	5.0m	25n	4.0				
1N4449	S			S	75	0.73	5.0m	25n	4.0				
1N4450	S			S	30	0.92	0.1	50n	4.0				
1N4451	S			S	30	0.875	0.1	50n	10				
1N4452	S			S	30	1.2	1.0	50n	50				
1N4453	S			S	20	0.92	0.1	50n					
1N4454	S			S	75	1.0	10m	0.1*	2.0				
1N4455	S			S	50	0.7	5.0m	0.1*					
1N4456	S			S	35	1.0	0.15	0.2*	1.5				
1N4457	S			S	50	1.0	0.2	0.2*	1.5				
1N4458	S			G	**800**	**1.5**	**5.0**	**0.5**	**150**				
1N4459	S			G	**1000**	**1.5**	**5.0**	**0.5**	**150**				
1N4460	S	1N4735A	1N4728	Z						**6.2**	**40**	**5.0**	**1.5W**
1N4461	S	1N4736A	1N4728	Z						**6.8**	**37**	**5.0**	**1.5W**
1N4462	S	1N4737A	1N4728	Z						**7.5**	**34**	**5.0**	**1.5W**
1N4463	S	1N4738A	1N4728	Z						**8.2**	**31**	**5.0**	**1.5W**
1N4464	S	1N4739A	1N4728	Z						**9.1**	**28**	**5.0**	**1.5W**
1N4465	S	1N4740A	1N4728	Z						**10**	**25**	**5.0**	**1.5W**
1N4466	S	1N4741A	1N4728	Z						**11**	**23**	**5.0**	**1.5W**
1N4467	S	1N4742A	1N4728	Z						**12**	**21**	**5.0**	**1.5W**
1N4468	S	1N4743A	1N4728	Z						**13**	**19**	**5.0**	**1.5W**
1N4469	S	1N4744A	1N4728	Z						**15**	**17**	**5.0**	**1.5W**
1N4470	S	1N4745A	1N4728	Z						**16**	**16**	**5.0**	**1.5W**
1N4471	S	1N4746A	1N4728	Z						**18**	**14**	**5.0**	**1.5W**
1N4472	S	1N4747A	1N4728	Z						**20**	**13**	**5.0**	**1.5W**
1N4473	S	1N4748A	1N4728	Z						**22**	**12**	**5.0**	**1.5W**
1N4474	S	1N4749A	1N4728	Z						**24**	**11**	**5.0**	**1.5W**
1N4475	S	1N4750A	1N4728	Z						**27**	**9.5**	**5.0**	**1.5W**
1N4476	S	1N4751A	1N4728	Z						**30**	**8.5**	**5.0**	**1.5W**
1N4477	S	1N4752A	1N4728	Z						**33**	**7.5**	**5.0**	**1.5W**
1N4478	S	1N4753A	1N4728	Z						**36**	**7.0**	**5.0**	**1.5W**
1N4479	S	1N4754A	1N4728	Z						**39**	**6.5**	**5.0**	**1.5W**
1N4480	S	1N4755A	1N4728	Z						**43**	**6.0**	**5.0**	**1.5W**
1N4481	S	1N4756A	1N4728	Z						**47**	**5.5**	**5.0**	**1.5W**
1N4482	S	1N4757A	1N4728	Z						**51**	**5.0**	**5.0**	**1.5W**
1N4483	S	1N4758A	1N4728	Z						**56**	**4.5**	**5.0**	**1.5W**
1N4484	S	1N4759A	1N4728	Z						**62**	**4.0**	**5.0**	**1.5W**
1N4485	S	1N4760A	1N4728	Z						**68**	**3.7**	**5.0**	**1.5W**
1N4486	S	1N4761A	1N4728	Z						**75**	**3.3**	**5.0**	**1.5W**
1N4487	S	1N4762A	1N4728	Z						**82**	**3.0**	**5.0**	**1.5W**
1N4488	S	1N4763A	1N4728	Z						**91**	**2.8**	**5.0**	**1.5W**
1N4489	S	1N4764A	1N4728	Z						**100**	**2.5**	**5.0**	**1.5W**
1N4490	S	1M110ZS5	1N4728	Z						**110**	**2.3**	**5.0**	**1.5W**
1N4491	S	1M120ZS5	1N4728	Z						**120**	**2.0**	**5.0**	**1.5W**
1N4492	S	1M130ZS5	1N4728	Z						**130**	**1.9**	**5.0**	**1.5W**
1N4493	S	1M150ZS5	1N4728	Z						**150**	**1.7**	**5.0**	**1.5W**
1N4494	S	1M160ZS5	1N4728	Z						**160**	**1.6**	**5.0**	**1.5W**
1N4495	S	1M180ZS5	1N4728	Z						**180**	**1.4**	**5.0**	**1.5W**
1N4496	S	1M200ZS5	1N4728	Z						**200**	**1.2**	**5.0**	**1.5W**
1N4497	S			G	**1600**	**3.0**	**0.75**	**0.1**	**35**				
1N4498	S			G	**3000**	**5.0**	**0.75**	**0.1**	**35**				
1N4499	S	1N4735A	1N4728	Z						**6.2**		**5.0**	**1.0W**
1N4500	S			S	80	1.0	0.3	0.1*	4.0				
1N4501	S			R						7.4	0.01		-55/100
1N4502	G			S	20	0.3	3.0m	10*					
1N4503	S	1N4752	1N4728	Z						**33**	**20**	**10**	**3.0W**
1N4504	S	1N5388A	1N5333	Z						**200**	**4.0**	**10**	**3.0W**
1N4505	S			G	**6000**	**8.5**	**0.1**	**0.1**	**20**				
1N4506	S	MR1122	MR1120	G	**200**	**1.4**	**12**	**2.5**	**240**				
1N4507	S	MR1124	MR1120	G	**400**	**1.4**	**12**	**2.5**	**240**				
1N4508	S	MR1126	MR1120	G	**600**	**1.4**	**12**	**2.5**	**240**				
1N4509	S	MR1128	MR1120	G	**800**	**1.4**	**12**	**2.0**	**240**				
1N4510	S	MR1130	MR1120	G	**1000**	**1.4**	**12**	**1.75**	**240**				
1N4511	S			G	**1200**	**1.4**	**12**	**1.5**	**240**				
1N4512	S			S	10	0.777	5.0m	10n					
1N4513	S			G	**2000**	**4.5**	**0.25**	**0.1**	**20**				
1N4514	S			G	**800**	**1.0**	**1.1**	**0.1**	**50**				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4517	S			G	**200**	**1.2**	**2.0**	**0.1**	**100**				
1N4523	G			S	15	1.0	0.1	30*	8.0				
1N4524	G			S	10	0.65	10m	12*	3.0				
1N4525	S			G	**200**	**1.4**	**35**	**3.5**	**500**				
1N4526	S			G	**400**	**1.4**	**35**	**3.5**	**500**				
1N4527	S			G	**600**	**1.4**	**35**	**3.5**	**500**				
1N4528	S			G	**800**	**1.4**	**35**	**3.0**	**500**				
1N4529	S			G	**1000**	**1.4**	**35**	**2.5**	**500**				
1N4530	S			G	**1200**	**1.4**	**35**	**2.0**	**500**				
1N4531	S			S	75	1.0	10m	25n	4.0				
1N4532	S			S	75	1.0	10m	0.1*	2.0				
1N4533	S			S	40	0.88	20m	50n	2.0				
1N4534	S			S	50	0.88	20m	50n	2.0				
1N4535	S			Z						3.45	5.0	5.0	0.5W
1N4536	S			S	25	1.0	30m	0.1*	2.0				
1N4537	S			G	**1500**	**1.85**	**3.0**	**0.3**	**15**				
1N4538	S			G	**2000**	**1.85**	**3.0**	**0.3**	**15**				
1N4539	S			G	**2500**	**1.85**	**3.0**	**0.3**	**15**				
1N4540	S			G	**3000**	**1.85**	**3.0**	**0.3**	**15**				
1N4541	S			S	225	1.0	0.4	20n					
1N4542	S			S	400	1.0	0.4	20n					
1N4543	S			S	600	1.0	0.4	20n					
1N4544	S			S	800	1.0	0.4	20n					
1N4545	S			S	1000	1.0	400m	0.02*					
1N4546	S			G	**25k**	**30**	**1.0**	**0.1**	**50**				
1N4547	S			S	25	1.0	25m	10n					
1N4548	S			S	25	1.0	30m	0.1*	4.0				
★1N4549	S		1N2804	Z						3.9	3.2	20	50W
★1N4549A	S		1N2804	Z						3.9	3.2	10	50W
★1N4549B	S		1N2804	Z						3.9	3.2	5.0	50W
★1N4550	S		1N2804	Z						4.3	2900	20	50W
★1N4550A	S		1N2804	Z						4.3	2900	10	50W
★1N4550B	S		1N2804	Z						4.3	2900	5.0	50W
★1N4551	S		1N2804	Z						4.7	2600	20	50W
★1N4551A	S		1N2804	Z						4.7	2600	10	50W
★1N4551B	S		1N2804	Z						4.7	2600	5.0	50W
★1N4552	S		1N2804	Z						5.1	2400	20	50W
★1N4552A	S		1N2804	Z						5.1	2400	10	50W
★1N4552B	S		1N2804	Z						5.1	2400	5.0	50W
★1N4553	S		1N2804	Z						5.6	2200	20	50W
★1N4553A	S		1N2804	Z						5.6	2200	10	50W
★1N4553B	S		1N2804	Z						5.6	2200	5.0	50W
★1N4554	S		1N2804	Z						6.2	2000	20	50W
★1N4554A	S		1N2804	Z						6.2	2000	10	50W
★1N4554B	S		1N2804	Z						6.2	2000	5.0	50W
★1N4555	S		1N2804	Z						6.8	1800	20	50W
★1N4555A	S		1N2804	Z						6.8	1800	10	50W
★1N4555B	S		1N2804	Z						6.8	1800	5.0	50W
★1N4556	S		1N2804	Z						7.5	1600	20	50W
★1N4556A	S		1N2804	Z						7.5	1600	10	50W
★1N4556B	S		1N2804	Z						7.5	1600	5.0	50W
★1N4557	S		1N2804	Z						3.9	3200	20	50W
★1N4557A	S		1N2804	Z						3.9	3200	10	50W
★1N4557B	S		1N2804	Z						3.9	3200	5.0	50W
★1N4558	S		1N2804	Z						4.3	2900	20	50W
★1N4558A	S		1N2804	Z						4.3	2900	10	50W
★1N4558B	S		1N2804	Z						4.3	2900	5.0	50W
★1N4559	S		1N2804	Z						4.7	2800	20	50W
★1N4559A	S		1N2804	Z						4.7	2800	10	50W
★1N4559B	S		1N2804	Z						4.7	2800	5.0	50W
★1N4560	S		1N2804	Z						5.1	2400	20	50W
★1N4560A	S		1N2804	Z						5.1	2400	10	50W
★1N4560B	S		1N2804	Z						5.1	2400	5.0	50W
★1N4561	S		1N2804	Z						5.6	2200	20	50W
★1N4561A	S		1N2804	Z						5.6	2200	10	50W
★1N4561B	S		1N2804	Z						5.6	2200	5.0	50W
★1N4562	S		1N2804	Z						6.2	2000	20	50W
★1N4562A	S		1N2804	Z						6.2	2000	10	50W
★1N4562B	S		1N2804	Z						6.2	2000	5.0	50W
★1N4563	S		1N2804	Z						6.8	1800	20	50W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N4563A	S		1N2804	Z						**6.8**	**1800**	**10**	**50W**
★1N4563B	S		1N2804	Z						**6.8**	**1800**	**5.0**	**50W**
★1N4564	S		1N2804	Z						**7.5**	**1600**	**20**	**50W**
★1N4564A	S		1N2804	Z						**7.5**	**1600**	**10**	**50W**
★1N4564B	S		1N2804	Z						**7.5**	**1600**	**5.0**	**50W**
★1N4565	S		1N4565	R						6.4	0.01	0.5	0/75
★1N4565A	S		1N4565	R						6.4	0.01	0.5	-55/100
★1N4566	S		1N4565	R						6.4	0.005	0.5	0/75
★1N4566A	S		1N4565	R						6.4	0.005	0.5	-55/100
★1N4567	S		1N4565	R						6.4	0.002	0.5	0/75
★1N4567A	S		1N4565	R						6.4	0.002	0.5	-55/100
★1N4568	S		1N4565	R						6.4	0.001	0.5	0/76
★1N4568A	S		1N4565	R						6.4	0.001	0.5	-55/100
★1N4569	S		1N4565	R						6.4	0.0005	0.5	0/75
★1N4569A	S		1N4565	R						6.4	0.0005	0.5	-55/100
★1N4570	S		1N4565	R						6.4	0.01	1.0	0/75
★1N4570A	S		1N4565	R						6.4	0.01	1.0	-55/100
★1N4571	S		1N4565	R						6.4	0.005	1.0	0/75
★1N4571A	S		1N4565	R						6.4	0.005	1.0	-55/100
★1N4572	S		1N4565	R						6.4	0.002	1.0	0/75
★1N4572A	S		1N4565	R						6.4	0.002	1.0	-55/100
★1N4573	S		1N4565	R						6.4	0.001	1.0	0/75
★1N4573A	S		1N4565	R						6.4	0.001	1.0	-55/100
★1N4574	S		1N4565	R						6.4	0.0005	1.0	0/75
★1N4574A	S		1N4565	R						6.4	0.0005	1.0	-55/100
★1N4575	S		1N4565	R						6.4	0.01	2.0	0/75
★1N4575A	S		1N4565	R						6.4	0.01	2.0	-55/100
★1N4576	S		1N4565	R						6.4	0.005	2.0	0/75
★1N4576A	S		1N4565	R						6.4	0.005	2.0	-55/100
★1N4577	S		1N4565	R						6.4	0.002	2.0	0/75
★1N4577A	S		1N4565	R						6.4	0.002	2.0	-55/100
★1N4578	S		1N4565	R						6.4	0.001	2.0	0/75
★1N4578A	S		1N4565	R						6.4	0.001	2.0	-55/100
★1N4579	S		1N4565	R						6.4	0.0005	2.0	0/75
★1N4579A	S		1N4565	R						6.4	0.0005	2.0	-55/100
★1N4580	S		1N4565	R						6.4	0.01	4.0	0/75
★1N4580A	S		1N4565	R						6.4	0.01	4.0	-55/100
★1N4581	S		1N4565	R						6.4	0.005	4.0	0/75
★1N4581A	S		1N4565	R						6.4	0.005	4.0	-55/100
★1N4582	S		1N4565	R						6.4	0.002	4.0	0/75
★1N4582A	S		1N4565	R						6.4	0.002	4.0	-55/100
★1N4583	S		1N4565	R						6.4	0.0001	4.0	0/75
★1N4583A	S		1N4565	R						6.4	0.0001	4.0	-55/100
★1N4584	S		1N4565	R						6.4	0.0005	4.0	0/75
★1N4584A	S		1N4565	R						6.4	0.0005	4.0	-55/100
1N4585	S			G	**800**	**1.3**	**1.0**	**0.2**	**50**				
1N4586	S			G	**1000**	**1.3**	**1.0**	**0.2**	**50**				
1N4587	S	MR1221SB	MR1220	G	**100**	**1.35**	**150**	**9.5**	**3000**				
1N4588	S	MR1223SB	MR1220	G	**200**	**1.35**	**150**	**9.5**	**3000**				
1N4589	S	MR1225SB	MR1220	G	**300**	**1.35**	**150**	**9.0**	**3000**				
1N4590	S	MR1227SB	MR1220	G	**400**	**1.35**	**150**	**9.0**	**3000**				
1N4591	S	MR1228SB	MR1220	G	**500**	**1.35**	**150**	**8.0**	**3000**				
1N4592	S	MR1229SB	MR1220	G	**600**	**1.35**	**150**	**6.5**	**3000**				
1N4593	S			G	**800**	**1.35**	**150**	**5.5**	**3000**				
1N4594	S			G	**1000**	**1.35**	**150**	**4.5**	**3000**				
1N4595	S			G	**1200**	**1.35**	**150**	**4.0**	**3000**				
1N4596	S			G	**1400**	**1.35**	**150**	**3.5**	**3000**				
1N4597	S			G	**5000**	**5.0**	**0.025**		**1.0**				
1N4598			Table 3	V									
1N4599			Table 3	V									
1N4600	S		Table 4	M									
1N4601	S		Table 4	M									
1N4602	S		Table 4	M									
1N4603	S		Table 4	M									
1N4604	S		Table 4	M									
1N4605	S		Table 4	M									
1N4606	S			S	70	1.0	0.2	0.25*	6.0				
1N4607	S			S	70	0.95	250m	0.25*	10				
1N4608	S			S	70	0.96	350m	0.25*	10				
1N4609	S		Table 3	V									

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4610	S			S	55	1.1	0.3	0.1*	2.0				
1N4611	S	1N4576A	1N4549	R						6.6	0.005	2.0	-50/175
1N4611A	S	1N4577A	1N4549	R						6.6	0.002	2.0	-50/175
1N4611B	S	1N4578A	1N4549	R						6.6	0.001	2.0	-50/175
1N4611C	S	1N4579A	1N4549	R						6.6	0.0005	2.0	-50/175
1N4612	S	1N4581A	1N4549	R						6.6	0.005	5.0	-50/175
1N4612A	S	1N4582A	1N4549	R						6.6	0.002	5.0	-50/175
1N4612B	S	1N4583A	1N4549	R						6.6	0.001	5.0	-50/175
1N4612C	S	1N4584A	1N4549	R						6.6	0.0005	5.0	-50/175
1N4613	S	1N4581A	1N4549	R						6.6	0.005	10	-50/175
1N4613A	S	1N4582A	1N4549	R						6.6	0.002	10	-50/175
1N4613B	S	1N4583A	1N4549	R						6.6	0.001	10	-50/175
1N4613C	S	1N4584A	1N4549	R						6.6	0.0005	10	-50/175
1N4614	S	MZ4614	1N4099	Z						1.8	0.25	5.0	0.25W
1N4615	S	MZ4615	1N4099	Z						2.0	0.25	5.0	0.25W
1N4616	S	MZ4616	1N4099	Z						2.2	0.25	5.0	0.25W
1N4617	S	MZ4617	1N4099	Z						2.4	0.25	5.0	0.25W
1N4618	S	MZ4618	1N4099	Z						2.7	0.25	5.0	0.25W
1N4619	S	MZ4619	1N4099	Z						3.0	0.25	5.0	0.25W
1N4620	S	MZ4620	1N4099	Z						3.3	0.25	5.0	0.25W
1N4621	S	MZ4621	1N4099	Z						3.6	0.25	5.0	0.25W
1N4622	S	MZ4622	1N4099	Z						3.9	0.25	5.0	0.25W
1N4623	S	MZ4623	1N4099	Z						4.3	0.25	5.0	0.25W
1N4624	S	MZ4624	1N4099	Z						4.7	0.25	5.0	0.25W
1N4625	S	MZ4625	1N4099	Z						5.1	0.25	5.0	0.25W
1N4626	S	MZ4626	1N4099	Z						5.6	0.25	5.0	0.25W
1N4627	S	MZ4627	1N4099	Z						6.2	0.25	5.0	0.25W
1N4628	S	1N4736A	1N4728	Z						6.8	19	5.0	0.6W
1N4629	S	1N4737A	1N4728	Z						7.5	17	5.0	0.6W
1N4630	S	1N4738A	1N4728	Z						8.2	15	5.0	0.6W
1N4631	S	1N4739A	1N4728	Z						9.1	14	5.0	0.6W
1N4632	S	1N4740A	1N4728	Z						10	13	5.0	0.6W
1N4633	S	1N4741A	1N4728	Z						11	12	5.0	0.6W
1N4634	S	1N4742A	1N4728	Z						12	11	5.0	0.6W
1N4635	S	1N4743A	1N4728	Z						13	9.5	5.0	0.6W
1N4636	S	1N4744A	1N4728	Z						15	8.5	5.0	0.6W
1N4637	S	1N4745A	1N4728	Z						16	7.8	5.0	0.6W
1N4638	S	1N4746A	1N4728	Z						18	7.0	5.0	0.6W
1N4639	S	1N4747A	1N4728	Z						20	6.2	5.0	0.6W
1N4640	S	1N4748A	1N4728	Z						22	6.0	5.0	0.6W
1N4641	S	1N4749A	1N4728	Z						24	5.2	5.0	0.6W
1N4642	S	1N4750A	1N4728	Z						27	4.6	5.0	0.6W
1N4643	S	1N4751A	1N4728	Z						30	4.2	5.0	0.6W
1N4644	S	1N4752A	1N4728	Z						33	3.8	5.0	0.6W
1N4645	S	1N4753A	1N4728	Z						36	3.4	5.0	0.6W
1N4646	S	1N4754A	1N4728	Z						39	3.2	5.0	0.6W
1N4647	S	1N4755A	1N4728	Z						43	3.0	5.0	0.6W
1N4648	S	1N4756A	1N4728	Z						47	2.7	5.0	0.6W
1N4649	S	1N4728A	1N4728	Z						3.3	10	5.0	1.0W
1N4650	S	1N4729A	1N4728	Z						3.6	10	5.0	1.0W
1N4651	S	1N4730A	1N4728	Z						3.9	64	5.0	1.0W
1N4652	S	1N4731A	1N4728	Z						4.3	58	5.0	1.0W
1N4653	S	1N4732A	1N4728	Z						4.7	53	5.0	1.0W
1N4654	S	1N4733A	1N4728	Z						5.1	49	5.0	1.0W
1N4655	S	1N4734A	1N4728	Z						5.6	45	5.0	1.0W
1N4656	S	1N4735A	1N4728	Z						6.2	41	5.0	1.0W
1N4657	S	1N4736A	1N4728	Z						6.8	37	5.0	1.0W
1N4658	S	1N4737A	1N4728	Z						7.5	34	5.0	1.0W
1N4659	S	1N4738A	1N4728	Z						8.2	31	5.0	1.0W
1N4660	S	1N4739A	1N4728	Z						9.1	28	5.0	1.0W
1N4661	S	1N4740A	1N4728	Z						10	25	5.0	1.0W
1N4662	S	1N4741A	1N4728	Z						11	23	5.0	1.0W
1N4663	S	1N4742A	1N4728	Z						12	21	5.0	1.0W
1N4664	S	1N4743A	1N4728	Z						13	19	5.0	1.0W
1N4665	S	1N4744A	1N4728	Z						15	17	5.0	1.0W
1N4666	S	1N4745A	1N4728	Z						16	16	5.0	1.0W
1N4667	S	1N4746A	1N4728	Z						18	14	5.0	1.0W
1N4668	S	1N4747A	1N4728	Z						20	13	5.0	1.0W
1N4669	S	1N4748A	1N4728	Z						22	12	5.0	1.0W
1N4670	S	1N4749A	1N4728	Z						24	11	5.0	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4671	S	1N4750A	1N4728	Z						27	9.5	5.0	1.0W
1N4672	S	1N4751A	1N4728	Z						30	8.5	5.0	1.0W
1N4673	S	1N4752A	1N4728	Z						33	7.5	5.0	1.0W
1N4674	S	1N4753A	1N4728	Z						36	7.0	5.0	1.0W
1N4675	S	1N4754A	1N4728	Z						39	6.5	5.0	1.0W
1N4676	S	1N4755A	1N4728	Z						43	6.0	5.0	1.0W
1N4677	S	1N4756A	1N4728	Z						47	5.5	5.0	1.0W
1N4678	S			Z						1.8	0.05	5.0	250m
1N4679	S			Z						2.0	0.05	5.0	250m
1N4680	S			Z						2.2	0.05	5.0	250m
1N4681	S			Z						2.4	0.05	5.0	250m
1N4682	S			Z						2.7	0.05	5.0	250m
1N4683	S			Z						3.0	0.05	5.0	250m
1N4684	S			Z						3.3	0.05	5.0	250m
1N4685	S			Z						3.6	0.05	5.0	250m
1N4686	S			Z						3.9	0.05	5.0	250m
1N4687	S			Z						4.3	0.05	5.0	250m
1N4688	S			Z						4.7	0.05	5.0	250m
1N4689	S			Z						5.1	0.05	5.0	250m
1N4690	S			Z						5.6	0.05	5.0	250m
1N4691	S			Z						6.2	0.05	5.0	250m
1N4692	S			Z						6.8	0.05	5.0	250m
1N4693	S			Z						7.5	0.05	5.0	250m
1N4694	S			Z						8.2	0.05	5.0	250m
1N4695	S			Z						8.7	0.05	5.0	250m
1N4696	S			Z						9.1	0.05	5.0	250m
1N4697	S			Z						10	0.05	5.0	250m
1N4698	S			Z						11	0.05	5.0	250m
1N4699	S			Z						12	0.05	5.0	250m
1N4700	S			Z						13	0.05	5.0	250m
1N4701	S			Z						14	0.05	5.0	250m
1N4702	S			Z						15	0.05	5.0	250m
1N4703	S			Z						16	0.05	5.0	250m
1N4704	S			Z						17	0.05	5.0	250m
1N4705	S			Z						18	0.05	5.0	250m
1N4706	S			Z						19	0.05	5.0	250m
1N4707	S			Z						20	0.05	5.0	250m
1N4708	S			Z						22	0.05	5.0	250m
1N4709	S			Z						24	0.05	5.0	250m
1N4710	S			Z						25	0.05	5.0	250m
1N4711	S			Z						27	0.05	5.0	250m
1N4712	S			Z						28	0.05	5.0	250m
1N4713	S			Z						30	0.05	5.0	250m
1N4714	S			Z						33	0.05	5.0	250m
1N4715	S			Z						36	0.05	5.0	250m
1N4716	S			Z						39	0.05	5.0	250m
1N4717	S			Z						43	0.05	5.0	250m
1N4718	S			S	50	1.2	0.75	50*	180				
★1N4719	S		1N4719	G	50	1.0	3.0	1.5	300				
★1N4720	S		1N4719	G	100	1.0	3.0	1.5	300				
★1N4721	S		1N4719	G	200	1.0	3.0	1.5	300				
★1N4722	S		1N4719	G	400	1.0	3.0	1.5	300				
★1N4723	S		1N4719	G	600	1.0	3.0	1.5	300				
★1N4724	S		1N4719	G	800	1.0	3.0	1.5	300				
★1N4725	S		1N4719	G	1000	1.0	3.0	1.5	300				
1N4726	S			S	20	0.85	10m	0.1*					
1N4727	S			S	20	0.85	10m	0.1*					
★1N4728	S		1N4728	Z						3.3	76	10	1.0W
★1N4728A	S		1N4728	Z						3.3	76	5.0	1.0W
★1N4729	S		1N4728	Z						3.6	69	10	1.0W
★1N4729A	S		1N4728	Z						3.6	69	5.0	1.0W
★1N4730	S		1N4728	Z						3.9	64	10	1.0W
★1N4730A	S		1N4728	Z						3.9	64	5.0	1.0W
★1N4731	S		1N4728	Z						4.3	58	10	1.0W
★1N4731A	S		1N4728	Z						4.3	58	5.0	1.0W
★1N4732	S		1N4728	Z						4.7	53	10	1.0W
★1N4732A	S		1N4728	Z						4.7	53	5.0	1.0W
★1N4733	S		1N4728	Z						5.1	49	10	1.0W
★1N4733A	S		1N4728	Z						5.1	49	5.0	1.0W
★1N4734	S		1N4728	Z						5.6	45	10	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N4734A	S		1N4728	Z						5.6	45	5.0	1.0W
★1N4735	S		1N4728	Z						6.2	41	10	1.0W
★1N4735A	S		1N4728	Z						6.2	41	5.0	1.0W
★1N4736	S		1N4728	Z						6.8	37	10	1.0W
★1N4736A	S		1N4728	Z						6.8	37	5.0	1.0W
★1N4737	S		1N4728	Z						7.5	34	10	1.0W
★1N4737A	S		1N4728	Z						7.5	34	5.0	1.0W
★1N4738	S		1N4728	Z						8.2	31	10	1.0W
★1N4738A	S		1N4728	Z						8.2	31	5.0	1.0W
★1N4739	S		1N4728	Z						9.1	28	10	1.0W
★1N4739A	S		1N4728	Z						9.1	28	5.0	1.0W
★1N4740	S		1N4728	Z						10	25	10	1.0W
★1N4740A	S		1N4728	Z						10	25	5.0	1.0W
★1N4741	S		1N4728	Z						11	23	10	1.0W
★1N4741A	S		1N4728	Z						11	23	5.0	1.0W
★1N4742	S		1N4728	Z						12	21	10	1.0W
★1N4742A	S		1N4728	Z						12	21	5.0	1.0W
★1N4743	S		1N4728	Z						13	19	10	1.0W
★1N4743A	S		1N4728	Z						13	19	5.0	1.0W
★1N4744	S		1N4728	Z						15	17	10	1.0W
★1N4744A	S		1N4728	Z						15	17	5.0	1.0W
★1N4745	S		1N4728	Z						16	15.5	10	1.0W
★1N4745A	S		1N4728	Z						16	15.5	5.0	1.0W
★1N4746	S		1N4728	Z						18	14	10	1.0W
★1N4746A	S		1N4728	Z						18	14	5.0	1.0W
★1N4747	S		1N4728	Z						20	12.5	10	1.0W
★1N4747A	S		1N4728	Z						20	12.5	5.0	1.0W
★1N4748	S		1N4728	Z						22	11.5	10	1.0W
★1N4748A	S		1N4728	Z						22	11.5	5.0	1.0W
★1N4749	S		1N4728	Z						24	10.5	10	1.0W
★1N4749A	S		1N4728	Z						24	10.5	5.0	1.0W
★1N4750	S		1N4728	Z						27	9.5	10	1.0W
★1N4750A	S		1N4728	Z						27	9.5	5.0	1.0W
★1N4751	S		1N4728	Z						30	8.5	10	1.0W
★1N4751A	S		1N4728	Z						30	8.5	5.0	1.0W
★1N4752	S		1N4728	Z						33	7.5	10	1.0W
★1N4752A	S		1N4728	Z						33	7.5	5.0	1.0W
★1N4753	S		1N4728	Z						36	7.0	10	1.0W
★1N4753A	S		1N4728	Z						36	7.0	5.0	1.0W
★1N4754	S		1N4728	Z						39	6.5	10	1.0W
★1N4754A	S		1N4728	Z						39	6.5	5.0	1.0W
★1N4755	S		1N4728	Z						43	6.0	10	1.0W
★1N4755A	S		1N4728	Z						43	6.0	5.0	1.0W
★1N4756	S		1N4728	Z						47	5.5	10	1.0W
★1N4756A	S		1N4728	Z						47	5.5	5.0	1.0W
★1N4757	S		1N4728	Z						51	5.0	10	1.0W
★1N4757A	S		1N4728	Z						51	5.0	5.0	1.0W
★1N4758	S		1N4728	Z						56	4.5	10	1.0W
★1N4758A	S		1N4728	Z						56	4.5	5.0	1.0W
★1N4759	S		1N4728	Z						62	4.0	10	1.0W
★1N4759A	S		1N4728	Z						62	4.0	5.0	1.0W
★1N4760	S		1N4728	Z						68	3.7	10	1.0W
★1N4760A	S		1N4728	Z						68	3.7	5.0	1.0W
★1N4761	S		1N4728	Z						75	3.3	10	1.0W
★1N4761A	S		1N4728	Z						75	3.3	5.0	1.0W
★1N4762	S		1N4728	Z						82	3.0	10	1.0W
★1N4762A	S		1N4728	Z						82	3.0	5.0	1.0W
★1N4763	S		1N4728	Z						91	2.8	10	1.0W
★1N4763A	S		1N4728	Z						91	2.8	5.0	1.0W
★1N4764	S		1N4728	Z						100	2.5	10	1.0W
★1N4764A	S		1N4728	Z						100	2.4	5.0	1.0W
★1N4765	S		1N4565	R						9.1	0.01	0.5	0/75
★1N4765A	S		1N4565	R						9.1	0.01	0.5	-55/100
★1N4766	S		1N4565	R						9.1	0.005	0.5	0/75
★1N4766A	S		1N4565	R						9.1	0.005	0.5	-55/100
★1N4767	S		1N4565	R						9.1	0.002	0.5	0/75
★1N4767A	S		1N4565	R						9.1	0.002	0.5	-55/100
★1N4768	S		1N4565	R						9.1	0.001	0.5	0/75
★1N4768A	S		1N4565	R						9.1	0.001	0.5	-55/100
★1N4769	S		1N4565	R						9.1	0.0005	0.5	0/75

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N4769A	S		1N4565	R						9.1	0.0005	0.5	-55/100
★1N4770	S		1N4565	R						9.1	0.01	1.0	0/75
★1N4770A	S		1N4565	R						9.1	0.01	1.0	-55/100
★1N4771	S		1N4565	R						9.1	0.005	1.0	0/75
★1N4771A	S		1N4565	R						9.1	0.005	1.0	-55/100
★1N4772	S		1N4565	R						9.1	0.002	1.0	0/75
★1N4772A	S		1N4565	R						9.1	0.002	1.0	-55/100
★1N4773	S		1N4565	R						9.1	0.001	1.0	0/75
★1N4773A	S		1N4565	R						9.1	0.001	1.0	-55/100
★1N4774	S		1N4565	R						9.1	0.0005	1.0	0/75
★1N4774A	S		1N4565	R						9.1	0.0005	1.0	-55/100
★1N4775	S		1N4565	R						8.5	0.01	0.5	0/75
★1N4775A	S		1N4565	R						8.5	0.01	0.5	-55/100
★1N4776	S		1N4565	R						8.5	0.005	0.5	0/75
★1N4776A	S		1N4565	R						8.5	0.005	0.5	-55/100
★1N4777	S		1N4565	R						8.5	0.002	0.5	0/75
★1N4777A	S		1N4565	R						8.5	0.002	0.5	-55/100
★1N4778	S		1N4565	R						8.5	0.001	0.5	0/75
★1N4778A	S		1N4565	R						8.5	0.001	0.5	-55/100
★1N4779	S		1N4565	R						8.5	0.0005	0.5	0/75
★1N4779A	S		1N4565	R						8.5	0.0005	0.5	-55/100
★1N4780	S		1N4565	R						8.5	0.01	1.0	0/75
★1N4780A	S		1N4565	R						8.5	0.01	1.0	-55/100
★1N4781	S		1N4565	R						8.5	0.005	1.0	0/75
★1N4781A	S		1N4565	R						8.5	0.005	1.0	-55/100
★1N4782	S		1N4565	R						8.5	0.002	1.0	0/75
★1N4782A	S		1N4565	R						8.5	0.002	1.0	-55/100
★1N4783	S		1N4565	R						8.5	0.001	1.0	0/75
★1N4783A	S		1N4565	R						8.5	0.001	1.0	-55/100
★1N4784	S		1N4565	R						8.5	0.0005	1.0	0/75
★1N4784A	S		1N4565	R						8.5	0.0005	1.0	-55/100
1N4786			Table 3	V									
thru													
1N4815			Table 3	V									
1N4816	S	1N4001	1N4001	G	50	1.3	1.5	0.25	50				
1N4817	S	1N4002	1N4001	G	100	1.3	1.5	0.25	50				
1N4818	S	1N4003	1N4001	G	200	1.3	1.5	0.25	50				
1N4819	S	1N4004	1N4001	G	300	1.3	1.5	0.25	50				
1N4820	S	1N4004	1N4001	G	400	1.3	1.5	0.25	50				
1N4821	S	1N4005	1N4001	G	500	1.3	1.5	0.25	50				
1N4822	S	1N4005	1N4001	G	600	1.3	1.5	0.25	50				
1N4823	S	1N4934	1N4933	G	100	1.25	1.0	1.0	35				
1N4824	S	1N4935	1N4933	G	200	1.25	1.0	1.0	35				
1N4825	S	1N4936	1N4933	G	400	1.25	1.0	1.0	35				
1N4826	S	1N4937	1N4933	G	600	1.25	1.0	1.0	35				
1N4827	G			S	30	1.0	40m	15*	0.2				
1N4828	S			S	20	1.1	0.1	0.1*					
1N4829	S			S	20	1.87	0.1	0.1*					
1N4830	S			S	20	2.69	0.1	0.1*					
1N4831	S	1N4739	1N4728	Z						9.1	28	20	1.2W
1N4831A	S	1N4739	1N4728	Z						9.1	28	10	1.2W
1N4831B	S	1N4739A	1N4728	Z						9.1	28	5.0	1.2W
1N4832	S	1N4740	1N4728	Z						10	25	20	1.2W
1N4832A	S	1N4740	1N4728	Z						10	25	10	1.2W
1N4832B	S	1N4740A	1N4728	Z						10	25	5.0	1.2W
1N4833	S	1N4741	1N4728	Z						11	23	20	1.2W
1N4833A	S	1N4741	1N4728	Z						11	23	10	1.2W
1N4833B	S	1N4741A	1N4728	Z						11	23	5.0	1.2W
1N4834	S	1N4742	1N4728	Z						12	21	20	1.2W
1N4834A	S	1N4742	1N4728	Z						12	21	10	1.2W
1N4834B	S	1N4742A	1N4728	Z						12	21	5.0	1.2W
1N4835	S	1N4743	1N4728	Z						13	19	20	1.2W
1N4835A	S	1N4743	1N4728	Z						13	19	10	1.2W
1N4835B	S	1N4743A	1N4728	Z						13	19	5.0	1.2W
1N4836	S	1N4744	1N4728	Z						15	17	20	1.2W
1N4836A	S	1N4744	1N4728	Z						15	17	10	1.2W
1N4836B	S	1N4744A	1N4728	Z						15	17	5.0	1.2W
1N4837	S	1N4745	1N4728	Z						16	16	20	1.2W
1N4837A	S	1N4745	1N4728	Z						16	16	10	1.2W
1N4837B	S	1N4745A	1N4728	Z						16	16	5.0	1.2W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4838	S	1N4746	1N4728	Z						18	14	20	1.2W
1N4838A	S	1N4746	1N4728	Z						18	14	10	1.2W
1N4838B	S	1N4746A	1N4728	Z						18	14	5.0	1.2W
1N4839	S	1N4747	1N4728	Z						20	19	20	1.2W
1N4839A	S	1N4747	1N4728	Z						20	19	10	1.2W
1N4839B	S	1N4747A	1N4728	Z						20	19	5.0	1.2W
1N4840	S	1N4748	1N4728	Z						22	11	20	1.2W
1N4840A	S	1N4748	1N4728	Z						22	11	10	1.2W
1N4840B	S	1N4748A	1N4728	Z						22	11	5.0	1.2W
1N4841	S	1N4749	1N4728	Z						24	11	20	1.2W
1N4841A	S	1N4749	1N4728	Z						24	11	10	1.2W
1N4841B	S	1N4749A	1N4728	Z						24	11	5.0	1.2W
1N4842	S	1N4750	1N4728	Z						27	9.3	20	1.2W
1N4842A	S	1N4750	1N4728	Z						27	9.3	10	1.2W
1N4842B	S	1N4750A	1N4728	Z						27	9.3	5.0	1.2W
1N4843	S	1N4751	1N4728	Z						30	8.3	20	1.2W
1N4843A	S	1N4751	1N4728	Z						30	8.3	10	1.2W
1N4843B	S	1N4751A	1N4728	Z						30	8.3	5.0	1.2W
1N4844	S	1N4752	1N4728	Z						33	7.5	20	1.2W
1N4844A	S	1N4752	1N4728	Z						33	7.5	10	1.2W
1N4844B	S	1N4752A	1N4728	Z						33	7.5	5.0	1.2W
1N4845	S	1N4753	1N4728	Z						36	7.0	20	1.2W
1N4845A	S	1N4753	1N4728	Z						36	7.0	10	1.2W
1N4845B	S	1N4753A	1N4728	Z						36	7.0	5.0	1.2W
1N4846	S	1N4754	1N4728	Z						39	6.5	20	1.2W
1N4846A	S	1N4754	1N4728	Z						39	6.5	10	1.2W
1N4846B	S	1N4754A	1N4728	Z						39	6.5	5.0	1.2W
1N4847	S	1N4755	1N4728	Z						43	5.8	20	1.2W
1N4847A	S	1N4755	1N4728	Z						43	5.8	10	1.2W
1N4847B	S	1N4755A	1N4728	Z						43	5.8	5.0	1.2W
1N4848	S	1N4756	1N4728	Z						47	5.3	20	1.2W
1N4848A	S	1N4756	1N4728	Z						47	5.3	10	1.2W
1N4848B	S	1N4756A	1N4728	Z						47	5.3	5.0	1.2W
1N4849	S	1N4757	1N4728	Z						51	5.0	20	1.2W
1N4849A	S	1N4757	1N4728	Z						51	5.0	10	1.2W
1N4849B	S	1N4757A	1N4728	Z						51	5.0	5.0	1.2W
1N4850	S	1N4758	1N4728	Z						56	4.5	20	1.2W
1N4850A	S	1N4758	1N4728	Z						56	4.5	10	1.2W
1N4850B	S	1N4758A	1N4728	Z						56	4.5	5.0	1.2W
1N4851	S	1N4759	1N4728	Z						62	4.0	20	1.2W
1N4851A	S	1N4759	1N4728	Z						62	4.0	10	1.2W
1N4851B	S	1N4759A	1N4728	Z						62	4.0	5.0	1.2W
1N4852	S	1N4760	1N4728	Z						68	3.7	20	1.2W
1N4852A	S	1N4760	1N4728	Z						68	3.7	10	1.2W
1N4852B	S	1N4760A	1N4728	Z						68	3.7	5.0	1.2W
1N4853	S	1N4761	1N4728	Z						75	3.3	20	1.2W
1N4853A	S	1N4761	1N4728	Z						75	3.3	10	1.2W
1N4853B	S	1N4761A	1N4728	Z						75	3.3	5.0	1.2W
1N4854	S	1N4762	1N4728	Z						82	3.0	20	1.2W
1N4854A	S	1N4762	1N4728	Z						82	3.0	10	1.2W
1N4854B	S	1N4762A	1N4728	Z						82	3.0	5.0	1.2W
1N4855	S	1N4763	1N4728	Z						91	2.8	20	1.2W
1N4855A	S	1N4763	1N4728	Z						91	2.8	10	1.2W
1N4855B	S	1N4763A	1N4728	Z						91	2.8	5.0	1.2W
1N4856	S	1N5764	1N4728	Z						100	2.5	20	1.2W
1N4856A	S	1N5764	1N4728	Z						100	2.5	10	1.2W
1N4856B	S	1N5764A	1N4728	Z						100	2.5	5.0	1.2W
1N4857	S	1M110ZS10	1N4728	Z						110	2.3	20	1.2W
1N4857A	S	1M110ZS10	1N4728	Z						110	2.3	10	1.2W
1N4857B	S	1M110ZS5	1N4728	Z						110	2.3	5.0	1.2W
1N4858	S	1M120ZS10	1N4728	Z						120	1.2	20	1.2W
1N4858A	S	1M120ZS10	1N4728	Z						120	1.2	10	1.2W
1N4858B	S	1M120ZS5	1N4728	Z						120	1.2	5.0	1.2W
1N4859	S	1M130ZS10	1N4728	Z						130	1.9	20	1.2W
1N4859A	S	1M130ZS10	1N4728	Z						130	1.9	10	1.2W
1N4859B	S	1M130ZS5	1N4728	Z						130	1.9	5.0	1.2W
1N4860	S	1M150ZS10	1N4728	Z						150	1.7	20	1.2W
1N4860A	S	1M150ZS10	1N4728	Z						150	1.7	10	1.2W
1N4860B	S	1M150ZS5	1N4728	Z						150	1.7	5.0	1.2W
1N4861	S			S	50	1.2	0.1	2.0n	1.0				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4862	S			S	50	1.1	0.1	5.0n	1.0				
1N4863	S			S	50	1.2	0.1	50n	7.0				
1N4864	S			S	80	1.1	0.1	0.1*	9.0				
1N4865	S			G	**1500**	**2.4**	**1.25**	**0.6**	**150**				
1N4866	S			G	**2500**	**3.6**	**1.25**	**0.6**	**150**				
1N4876	S			G	**3000**	**4.8**	**1.25**	**0.6**	**150**				
1N4868	S			G	**5000**	**8.4**	**1.25**	**0.6**	**150**				
1N4869	S			G	**7500**	**12**	**1.25**	**0.6**	**150**				
1N4870	S			G	**10k**	**16**	**1.25**	**0.6**	**150**				
1N4871	S			G	**12k**	**18**	**1.25**	**0.6**	**150**				
1N4872	S			G	**15k**	**23**	**1.25**	**0.6**	**150**				
1N4873	S			G	**20k**	**30**	**1.25**	**0.6**	**150**				
1N4874	S			G	**25k**	**38**	**1.25**	**0.6**	**150**				
1N4875	S			G	**30k**	**46**	**1.25**	**0.6**	**150**				
1N4876	S			G	**40k**	**60**	**1.25**	**0.6**	**150**				
1N4877	S			G	**50k**	**76**	**1.25**	**0.6**	**150**				
1N4878	S			G	**100**	**1.3**	**100**	**5.0**	**1500**				
1N4879	S	MR1221SB	MR1220	G	**100**	**1.3**	**160**	**10**	**2200**				
1N4880	S			G	**100**	**1.2**	**250**	**10**	**4000**				
1N4881	S	1N4747	1N4728	Z						**40**	**20**	**10**	**3.0W**
1N4882	S	1N4753	1N4728	Z						**20**	**36**	**10**	**3.0W**
1N4883	S	1N4742A	1N4728	Z						**65**	**12**	**5.0**	**3.0W**
1N4884	S	1N4747A	1N4728	Z						**40**	**20**	**5.0**	**3.0W**
1N4885			Table 3	V									
1N4886			Table 3	V									
1N4887	S			G	**75k**	**115**	**1.25**	**0.6**	**150**				
1N4888	S			S	12	1.0	20m	50n					
1N4889	S	1N3000B	1N2970	Z						**62**	**20**	**5.0**	**5.0W**
1N4890	S	MZ640	MZ600	R						6.35	0.001	7.5	25/100
1N4890A	S	MZ640	MZ600	R						6.35	0.001	7.5	-55/100
1N4891	S	MZ640	MZ600	R						6.35	0.0005	7.5	25/100
1N4891A	S	MZ640	MZ600	R						6.35	0.0005	7.5	-55/100
1N4892	S	MZ620	MZ600	R						6.35	0.001	7.5	25/100
1N4892A	S	MZ620	MZ600	R						6.35	0.001	7.5	-55/100
1N4893	S	MZ620	MZ600	R						6.35	0.0005	7.5	25/100
1N4893A	S	MZ620	MZ600	R						6.35	0.0005	7.5	-55/100
1N4894	S	MZ610	MZ600	R						6.35	0.001	7.5	25/100
1N4894A	S	MZ610	MZ600	R						6.35	0.001	7.5	-55/100
1N4895	S	MZ610	MZ600	R						6.35	0.0005	7.5	25/100
1N4895A	S	MZ610	MZ600	R						6.35	0.0005	7.5	-55/100
★1N4896	S		1N4765	R						12.8	0.01	0.5	25/100
★1N4896A	S		1N4765	R						12.8	0.01	0.5	-55/100
★1N4897	S		1N4765	R						12.8	0.005	0.5	25/100
★1N4897A	S		1N4765	R						12.8	0.005	0.5	-55/100
★1N4898	S		1N4765	R						12.8	0.002	0.5	25/100
★1N4898A	S		1N4765	R						12.8	0.002	0.5	-55/100
★1N4899	S		1N4765	R						12.8	0.001	0.5	25/100
★1N4899A	S		1N4765	R						12.8	0.001	0.5	-55/100
★1N4900	S		1N4765	R						12.8	0.01	1.0	25/100
★1N4900A	S		1N4765	R						12.8	0.01	1.0	-55/100
★1N4901	S		1N4765	R						12.8	0.005	1.0	25/100
★1N4901A	S		1N4765	R						12.8	0.005	1.0	-55/100
★1N4902	S		1N4765	R						12.8	0.002	1.0	25/100
★1N4902A	S		1N4765	R						12.8	0.002	1.0	-55/100
★1N4903	S		1N4765	R						12.8	0.001	1.0	25/100
★1N4903A	S		1N4765	R						12.8	0.001	1.0	-55/100
★1N4904	S		1N4765	R						12.8	0.01	2.0	25/100
★1N4904A	S		1N4765	R						12.8	0.01	2.0	-55/100
★1N4905	S		1N4765	R						12.8	0.005	2.0	25/100
★1N4905A	S		1N4765	R						12.8	0.005	2.0	-55/100
★1N4906	S		1N4765	R						12.8	0.002	2.0	25/100
★1N4906A	S		1N4765	R						12.8	0.002	2.0	-55/100
★1N4907	S		1N4765	R						12.8	0.001	2.0	25/100
★1N4907A	S		1N4765	R						12.8	0.001	2.0	-55/100
★1N4908	S		1N4765	R						12.8	0.01	4.0	25/100
★1N4908A	S		1N4765	R						12.8	0.01	4.0	-55/100
★1N4909	S		1N4765	R						12.8	0.005	4.0	25/100
★1N4909A	S		1N4765	R						12.8	0.005	4.0	-55/100
★1N4910	S		1N4765	R						12.8	0.002	4.0	25/100
★1N4910A	S		1N4765	R						12.8	0.002	4.0	-55/100

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N4911	S		1N4765	R						12.8	0.001	4.0	25/100
★1N4911A	S		1N4765	R						12.8	0.001	4.0	-55/100
★1N4912	S		1N4765	R						12.8	0.01	7.5	25/100
★1N4912A	S		1N4765	R						12.8	0.01	7.5	-55/100
★1N4913	S		1N4765	R						12.8	0.005	7.5	25/100
★1N4913A	S		1N4765	R						12.8	0.005	7.5	-55/100
★1N4914	S		1N4765	R						12.8	0.002	7.5	25/100
★1N4914A	S		1N4765	R						12.8	0.002	7.5	-55/100
★1N4915	S		1N4765	R						12.8	0.001	7.5	25/100
★1N4915A	S		1N4765	R						12.8	0.001	7.5	-55/100
★1N4916	S		1N4765	R						19.2	0.01	0.5	25/100
★1N4916A	S		1N4765	R						19.2	0.01	0.5	-55/100
★1N4917	S		1N4765	R						19.2	0.005	0.5	25/100
★1N4917A	S		1N4765	R						19.2	0.005	0.5	-55/100
★1N4918	S		1N4765	R						19.2	0.002	0.5	25/100
★1N4918A	S		1N4765	R						19.2	0.002	0.5	-55/100
★1N4919	S		1N4765	R						19.2	0.01	1.0	25/100
★1N4919A	S		1N4765	R						19.2	0.01	1.0	-55/100
★1N4920	S		1N4765	R						19.2	0.005	1.0	25/100
★1N4920A	S		1N4765	R						19.2	0.005	1.0	-55/100
★1N4921	S		1N4765	R						19.2	0.002	1.0	25/100
★1N4921A	S		1N4765	R						19.2	0.002	1.0	-55/100
★1N4922	S		1N4765	R						19.2	0.01	2.0	25/100
★1N4922A	S		1N4765	R						19.2	0.01	2.0	-55/100
★1N4923	S		1N4765	R						19.2	0.005	2.0	25/100
★1N4923A	S		1N4765	R						19.2	0.005	2.0	-55/100
★1N4924	S		1N4765	R						19.2	0.002	2.0	25/100
★1N4924A	S		1N4765	R						19.2	0.002	2.0	-55/100
★1N4925	S		1N4765	R						19.2	0.01	4.0	25/100
★1N4925A	S		1N4765	R						19.2	0.01	4.0	-55/100
★1N4926	S		1N4765	R						19.2	0.005	4.0	25/100
★1N4926A	S		1N4765	R						19.2	0.005	4.0	-55/100
★1N4927	S		1N4765	R						19.2	0.002	4.0	25/100
★1N4927A	S		1N4765	R						19.2	0.002	4.0	-55/100
★1N4928	S		1N4765	R						19.2	0.001	4.0	25/100
★1N4928A	S		1N4765	R						19.2	0.001	4.0	-55/100
★1N4929	S		1N4765	R						19.2	0.01	7.5	25/100
★1N4929A	S		1N4765	R						19.2	0.01	7.5	-55/100
★1N4930	S		1N4765	R						19.2	0.005	7.5	25/100
★1N4930A	S		1N4765	R						19.2	0.005	7.5	-55/100
★1N4931	S		1N4765	R						19.2	0.002	7.5	25/100
★1N4931A	S		1N4765	R						19.2	0.002	7.5	-55/100
★1N4932	S		1N4765	R						19.2	0.001	7.5	25/100
★1N4932A	S		1N4765	R						19.2	0.001	7.5	-55/100
★1N4933	S		1N4933	F	**50**	**1.2**	**1.0**	**0.3**	**30**				
★1N4934	S		1N4933	F	**100**	**1.2**	**1.0**	**0.3**	**30**				
★1N4935	S		1N4933	F	**200**	**1.2**	**1.0**	**0.3**	**30**				
★1N4936	S		1N4933	F	**400**	**1.2**	**1.0**	**0.3**	**30**				
★1N4937	S		1N4933	F	**600**	**1.2**	**1.0**	**0.3**	**30**				
1N4938	S			S	200	1.0	0.1	0.1*	50				
1N4939	G		Table 4	M									
1N4940	G		Table 4	M									
1N4941			Table 3	V									
1N4942	S			S	200	1.5	3.0	0.5m	150n				
1N4943	S			S	300	1.5	3.0	0.5m	150n				
1N4944	S			S	400	1.5	3.0	0.5m	150n				
1N4945	S			S	500	1.5	3.0	0.5m	150n				
1N4946	S			S	600	1.5	3.0	0.5m	250n				
1N4947	S			S	800	1.5	3.0	0.5m	300n				
1N4948	S			S	1000	1.5	3.0	0.5m	500n				
1N4950	S			S	25	0.53	1.0m	0.1m					
1N4951	S			S	20	0.85	1.0m	0.1*					
1N4952	S			S	50	0.85	1.0m	0.1*					
1N4954	S	1N5342B	1N5333	Z						**6.8**	**175**	**5.0**	**3.0W**
1N4955	S	1N5343B	1N5333	Z						**7.5**	**175**	**5.0**	**3.0W**
1N4956	S	1N5344B	1N5333	Z						**8.2**	**150**	**5.0**	**3.0W**
1N4957	S	1N5346B	1N5333	Z						**9.1**	**150**	**5.0**	**3.0W**
1N4958	S	1N5347B	1N5333	Z						**10**	**125**	**5.0**	**3.0W**
1N4959	S	1N5348B	1N5333	Z						**11**	**120**	**5.0**	**3.0W**
1N4960	S	1N5349B	1N5333	Z						**12**	**100**	**5.0**	**3.0W**

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N4961	S	1N5350B	1N5333	Z						13	100	5.0	3.0W
1N4962	S	1N5352B	1N5333	Z						15	75	5.0	3.0W
1N4963	S	1N5353B	1N5333	Z						16	5.0	5.0	3.0W
1N4964	S	1N5355B	1N5333	Z						18	65	5.0	3.0W
1N4965	S	1N5357B	1N5333	Z						20	65	5.0	3.0W
1N4966	S	1N5358B	1N5333	Z						22	50	5.0	3.0W
1N4967	S	1N5359B	1N5333	Z						24	50	5.0	3.0W
1N4968	S	1N5361B	1N5333	Z						27	50	5.0	3.0W
1N4969	S	1N5363B	1N5333	Z						30	40	5.0	3.0W
1N4970	S	1N5364B	1N5333	Z						33	40	5.0	3.0W
1N4971	S	1N5365B	1N5333	Z						36	30	5.0	3.0W
1N4972	S	1N5366B	1N5333	Z						39	30	5.0	3.0W
1N4973	S	1N5367B	1N5333	Z						43	30	5.0	3.0W
1N4974	S	1N5368B	1N5333	Z						47	25	5.0	3.0W
1N4975	S	1N5369B	1N5333	Z						51	25	5.0	3.0W
1N4976	S	1N5370B	1N5333	Z						56	20	5.0	3.0W
1N4977	S	1N5372B	1N5333	Z						62	20	5.0	3.0W
1N4978	S	1N5373B	1N5333	Z						68	20	5.0	3.0W
1N4979	S	1N5374B	1N5333	Z						75	20	5.0	3.0W
1N4980	S	1N5375B	1N5333	Z						82	15	5.0	3.0W
1N4981	S	1N5377B	1N5333	Z						91	15	5.0	3.0W
1N4982	S	1N5378B	1N5333	Z						100	12	5.0	3.0W
1N4983	S	1N5379B	1N5333	Z						110	12	5.0	3.0W
1N4984	S	1N5380B	1N5333	Z						120	10	5.0	3.0W
1N4985	S	1N5381B	1N5333	Z						130	19	5.0	3.0W
1N4986	S	1N5383B	1N5333	Z						150	8.0	5.0	3.0W
1N4987	S	1N5384B	1N5333	Z						160	8.0	5.0	3.0W
1N4988	S	1N5386B	1N5333	Z						180	5.0	5.0	3.0W
1N4989	S	1N5388B	1N5333	Z						200	5.0	5.0	3.0W
1N4990	S			Z						220	5.0	5.0	3.0W
1N4991	S			Z						240	5.0	5.0	3.0W
1N4992	S			Z						270	5.0	5.0	3.0W
1N4993	S			Z						300	4.0	5.0	3.0W
1N4994	S			Z						330	4.0	5.0	3.0W
1N4995	S			Z						360	3.0	5.0	3.0W
1N4996	S			Z						390	3.0	5.0	3.0W
★1N4997	S		1N4719	G	50	1.0	3.0	2.0	300				
★1N4998	S		1N4719	G	100	1.0	3.0	2.0	300				
★1N4999	S		1N4719	G	200	1.0	3.0	2.0	300				
★1N5000	S		1N4719	G	400	1.0	3.0	2.0	300				
★1N5001	S		1N4719	G	600	1.0	3.0	1.0	300				
★1N5002	S		1N4719	G	800	1.0	3.0	1.0	300				
★1N5003	S		1N4719	G	1000	1.0	3.0	1.0	300				
1N5004	S			G	100	1.3	1.0	1.0	35				
1N5005	S			G	200	1.3	1.0	1.0	35				
1N5006	S			G	400	1.3	1.0	1.0	35				
1N5007	S			G	600	1.3	1.0	1.0	35				
1N5008	S	1N4728	1N4728	Z						3.3	189	10	2.5W
1N5008A	S	1N4728A	1N4728	Z						3.3	189	5.0	2.5W
1N5009	S	1N4729	1N4728	Z						3.6	173	10	2.5W
1N5009A	S	1N4729A	1N4728	Z						3.6	173	5.0	2.5W
1N5010	S	1N4730	1N4728	Z						3.9	160	10	2.5W
1N5010A	S	1N4730A	1N4728	Z						3.9	160	5.0	2.5W
1N5011	S	1N4731	1N4728	Z						4.3	145	10	2.5W
1N5011A	S	1N4731A	1N4728	Z						4.3	145	5.0	2.5W
1N5012	S	1N4732	1N4728	Z						4.7	133	10	2.5W
1N5012A	S	1N4732A	1N4728	Z						4.7	133	5.0	2.5W
1N5013	S	1N4733	1N4728	Z						5.1	122	10	2.5W
1N5013A	S	1N4733A	1N4728	Z						5.1	122	5.0	2.5W
1N5014	S	1N4734	1N4728	Z						5.6	111	10	2.5W
1N5014A	S	1N4734A	1N4728	Z						5.6	111	5.0	2.5W
1N5015	S	1N4735	1N4728	Z						6.2	104	10	2.5W
1N5015A	S	1N4735A	1N4728	Z						6.2	104	5.0	2.5W
1N5016	S	1N4736	1N4728	Z						6.8	92	10	2.5W
1N5016A	S	1N4736A	1N4728	Z						6.8	92	5.0	2.5W
1N5017	S	1N4737	1N4728	Z						7.5	83	10	2.5W
1N5017A	S	1N4737A	1N4728	Z						7.5	83	5.0	2.5W
1N5018	S	1N4738	1N4728	Z						8.2	76	10	2.5W
1N5018A	S	1N4738A	1N4728	Z						8.2	76	5.0	2.5W
1N5019	S	1N4739	1N4728	Z						9.1	69	10	2.5W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5019A	S	1N4739A	1N4728	Z						9.1	69	5.0	2.5W
1N5020	S	1N4740	1N4728	Z						10	62	10	2.5W
1N5020A	S	1N4740A	1N4728	Z						10	62	5.0	2.5W
1N5021	S	1N4741	1N4728	Z						11	57	10	2.5W
1N5021A	S	1N4741A	1N4728	Z						11	57	5.0	2.5W
1N5022	S	1N4742	1N4728	Z						12	52	10	2.5W
1N5022A	S	1N4742A	1N4728	Z						12	52	5.0	2.5W
1N5023	S	1N4743	1N4728	Z						13	48	10	2.5W
1N5023A	S	1N4743A	1N4728	Z						13	48	5.0	2.5W
1N5024	S	1M14ZS10		Z						14	45	10	2.5W
1N5024A	S	1M14ZS5		Z						14	45	5.0	2.5W
1N5025	S	1N4744	1N4728	Z						15	42	10	2.5W
1N5025A	S	1N4744A	1N4728	Z						15	42	5.0	2.5W
1N5026	S	1N4745	1N4728	Z						16	39	10	2.5W
1N5026A	S	1N4745A	1N4728	Z						16	39	5.0	2.5W
1N5027	S	1M17ZS10		Z						17	37	10	2.5W
1N5027A	S	1M17ZS5		Z						17	37	5.0	2.5W
1N5028	S	1N4746	1N4728	Z						18	35	10	2.5W
1N5028A	S	1N4746A	1N4728	Z						18	35	5.0	2.5W
1N5029	S	1M19ZS10		Z						19	33	10	2.5W
1N5029A	S	1M19ZS5		Z						19	33	5.0	2.5W
1N5030	S	1N4747	1N4728	Z						20	31	10	2.5W
1N5030A	S	1N4747A	1N4728	Z						20	31	5.0	2.5W
1N5031	S	1N4748	1N4728	Z						22	28	10	2.5W
1N5031A	S	1N4748A	1N4728	Z						22	28	5.0	2.5W
1N5032	S	1N4749	1N4728	Z						24	26	10	2.5W
1N5032A	S	1N4749A	1N4728	Z						24	26	5.0	2.5W
1N5033	S	1M25ZS10		Z						25	25	10	2.5W
1N5033A	S	1M25ZS5		Z						25	25	5.0	2.5W
1N5034	S	1N4750	1N4728	Z						27	23	10	2.5W
1N5034A	S	1N4750A	1N4728	Z						27	23	5.0	2.5W
1N5035	S	1N4751	1N4728	Z						30	21	10	2.5W
1N5035A	S	1N4751A	1N4728	Z						30	21	5.0	2.5W
1N5036	S	1N4752	1N4728	Z						33	19	10	2.5W
1N5036A	S	1N4752A	1N4728	Z						33	19	5.0	2.5W
1N5037	S	1N4753	1N4728	Z						36	17	10	2.5W
1N5037A	S	1N4753A	1N4728	Z						36	17	5.0	2.5W
1N5038	S	1N4754	1N4728	Z						39	16	10	2.5W
1N5038A	S	1N4754A	1N4728	Z						39	16	5.0	2.5W
1N5039	S	1N4755	1N4728	Z						43	15	10	2.5W
1N5039A	S	1N4755A	1N4728	Z						43	15	5.0	2.5W
1N5040	S	1M45ZS10		Z						45	14	10	2.5W
1N5040A	S	1M45ZS5		Z						45	14	5.0	2.5W
1N5041	S	1N4756	1N4728	Z						47	13	10	2.5W
1N5041A	S	1N4756A	1N4728	Z						47	13	5.0	2.5W
1N5042	S	1M50ZS10		Z						50	12	10	2.5W
1N5042A	S	1M50ZS5		Z						50	12	5.0	2.5W
1N5043	S	1N4757	1N4728	Z						51	12	10	2.5W
1N5043A	S	1N4757A	1N4728	Z						51	12	5.0	2.5W
1N5044	S	1M52ZS10	1N4728	Z						52	12	10	2.5W
1N5044A	S	1M52ZS5	1N4728	Z						52	12	5.0	2.5W
1N5045	S	1N4758	1N4728	Z						56	11	10	2.5W
1N5045A	S	1N4758A	1N4728	Z						56	11	5.0	2.5W
1N5046	S	1N4759	1N4728	Z						62	10	10	2.5W
1N5046A	S	1N4759A	1N4728	Z						62	10	5.0	2.5W
1N5047	S	1N4760	1N4728	Z						68	9.2	10	2.5W
1N5047A	S	1N4760A	1N4728	Z						68	9.2	5.0	2.5W
1N5048	S	1N4761	1N4728	Z						75	8.3	10	2.5W
1N5048A	S	1N4761A	1N4728	Z						75	8.3	5.0	2.5W
1N5049	S	1N4762	1N4728	Z						82	7.6	10	2.5W
1N5049A	S	1N4762A	1N4728	Z						82	7.6	5.0	2.5W
1N5050	S	1N4763	1N4728	Z						91	6.9	10	2.5W
1N5050A	S	1N4763A	1N4728	Z						91	6.9	5.0	2.5W
1N5051	S	1N4764	1N4728	Z						100	6.2	10	2.5W
1N5051A	S	1N4764A	1N4728	Z						100	6.2	5.0	2.5W
1N5052	S	1N4006	1N4001	G	700	1.3	1.5	0.5	50				
1N5053	S	1N4006	1N4001	G	800	1.3	1.5	0.5	50				
1N5054	S	1N4007	1N4001	G	1000	1.3	1.5	0.5	50				
1N5055	S	1N4002	1N4001	G	100	1.4	1.0	0.25	30				
1N5056	S	1N4003	1N4001	G	200	1.4	1.0	0.25	30				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5057	S	1N4004	1N4001	G	300	1.4	0.8	0.25	30				
1N5058	S	1N4004	1N4001	G	400	1.4	0.8	0.25	30				
1N5059	S	1N4003	1N4001	G	200	1.0	1.5	0.3	100				
1N5060	S	1N4004	1N4001	G	400	1.0	1.5	0.3	100				
1N5061	S	1N4005	1N4001	G	600	1.0	1.5	0.2	100				
1N5062	S	1N4006	1N4001	G	800	1.0	1.25	0.2	100				
1N5063	S	1N4736A	1N4728	Z						6.8	75	5.0	3.0W
1N5064	S	1N4737A	1N4728	Z						7.5	75	5.0	3.0W
1N5065	S	1N4738A	1N4728	Z						8.2	75	5.0	3.0W
1N5066	S	1N4739A	1N4728	Z						9.1	75	5.0	3.0W
1N5067	S	1N4740A	1N4728	Z						10	75	5.0	3.0W
1N5068	S	1N4741A	1N4728	Z						11	70	5.0	3.0W
1N5069	S	1N4743A	1N4728	Z						13	50	5.0	3.0W
1N5070	S	1M14ZS5		Z						14	50	5.0	3.0W
1N5071	S	1N4744A	1N4728	Z						15	50	5.0	3.0W
1N5072	S	1N4745A	1N4728	Z						16	50	5.0	3.0W
1N5073	S	1N4746A	1N4728	Z						18	40	5.0	3.0W
1N5074	S	1N4748A	1N4728	Z						22	30	5.0	3.0W
1N5075	S	1N4749A	1N4728	Z						24	30	5.0	3.0W
1N5076	S	1N4750A	1N4728	Z						27	25	5.0	3.0W
1N5077	S	1N4751A	1N4728	Z						30	25	5.0	3.0W
1N5078	S	1N4752A	1N4728	Z						33	20	5.0	3.0W
1N5079	S	1N4753A	1N4728	Z						36	20	5.0	3.0W
1N5080	S	1N4754A	1N4728	Z						39	20	5.0	3.0W
1N5081	S	1M40ZS5		Z						40	20	5.0	3.0W
1N5081	S	1M40ZS5		Z						40	20	5.0	3.0W
1N5082	S	1N4755A	1N4728	Z						43	15	5.0	3.0W
1N5083	S	1M45ZS5		Z						45	15	5.0	3.0W
1N5084	S	1N4756A	1N4728	Z						47	15	5.0	3.0W
1N5085	S	1M50ZS5		Z						50	15	5.0	3.0W
1N5086	S	1N4757A	1N4728	Z						51	15	5.0	3.0W
1N5087	S	1N4758A	1N4728	Z						56	10	5.0	3.0W
1N5088	S	1M60ZS5		Z						60	10	5.0	3.0W
1N5089	S	1N4759A	1N4728	Z						62	10	5.0	3.0W
1N5090	S	1N4760A		Z						68	10	5.0	3.0W
1N5091	S	1M70ZS5		Z						70	10	5.0	3.0W
1N5092	S	1N4761A	1N4728	Z						75	10	5.0	3.0W
1N5093	S	1M80ZS5		Z						80	10	5.0	3.0W
1N5094	S	1N4762A	1N4728	Z						82	10	5.0	3.0W
1N5095	S	1N4763A	1N4728	Z						91	8.0	5.0	3.0W
1N5096	S	1M110ZS5	1N4728	Z						110	5.0	5.0	3.0W
1N5097	S	1M120ZS5	1N4728	Z						120	5.0	5.0	3.0W
1N5098	S	1M130ZS5	1N4728	Z						130	5.0	5.0	3.0W
1N5099	S	1M140ZS5	1N4728	Z						140	5.0	5.0	3.0W
1N5100	S	1M160ZS5	1N4728	Z						160	4.0	5.0	3.0W
1N5101	S	1M170ZS5	1N4728	Z						170	4.0	5.0	3.0W
1N5102	S	1M180ZS5	1N4728	Z						180	4.0	5.0	3.0W
1N5103	S	1M190ZS5	1N4728	Z						190	4.0	5.0	3.0W
1N5104	S	1M200ZS5	1N4728	Z						200	3.0	5.0	3.0W
1N5105	S	1M110ZSB5	1N4728	Z						220	3.0	5.0	3.0W
1N5106	S	1M120ZSB5	1N4728	Z						240	3.0	5.0	3.0W
1N5107	S	1M130ZSB5	1N4728	Z						260	3.0	5.0	3.0W
1N5108	S	1M135ZSB5	1N4728	Z						270	3.0	5.0	3.0W
1N5109	S	1M140ZSB5	1N4728	Z						280	3.0	5.0	3.0W
1N5110	S	1M150ZSB5	1N4728	Z						300	3.0	5.0	3.0W
1N5111	S	1M160ZSB5	1N4728	Z						320	2.0	5.0	3.0W
1N5112	S	1M165ZSB5	1N4728	Z						330	2.0	5.0	3.0W
1N5113	S	1M170ZSB5	1N4728	Z						340	2.0	5.0	3.0W
1N5114	S	1M180ZSB5	1N4728	Z						360	2.0	5.0	3.0W
1N5115	S	1M190ZSB5	1N4728	Z						380	2.0	5.0	3.0W
1N5116	S	1M195ZSB5	1N4728	Z						390	2.0	5.0	3.0W
1N5117	S			Z						400	2.0	5.0	3.0W
1N5118	S	1N5341B	1N5333	Z						14	100	5.0	5.0W
1N5119	S			Z						40	30	5.0	5.0W
1N5120	S			Z						45	30	5.0	5.0W
1N5121	S			Z						50	25	5.0	5.0W
1N5122	S	1N5371B	1N5333	Z						60	20	5.0	5.0W
1N5123	S			Z						70	20	5.0	5.0W
1N5124	S			Z						80	15	5.0	5.0W
1N5125	S			Z						90	15	5.0	5.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5126	S	1N5382B	1N5333	Z						140	8.0	5.0	5.0W
1N5127	S	1N5385B	1N5333	Z						170	8.0	5.0	5.0W
1N5128	S	1N5387B	1N5333	Z						190	5.0	5.0	5.0W
1N5129	S			Z						260	5.0	5.0	5.0W
1N5130	S			Z						280	4.0	5.0	5.0W
1N5131	S			Z						320	4.0	5.0	5.0W
1N5132	S			Z						340	4.0	5.0	5.0W
1N5133	S			Z						380	3.0	5.0	5.0W
1N5134	S			Z							3.0	5.0	5.0W
1N5136			Table 3	V									
thru 1N5148			Table 3	V									
1N5136A			Table 3	V									
thru 1N5148A			Table 3	V									
1N5150A			Table 3	V									
1N5152A			Table 3	V									
1N5153A			Table 3	V									
1N5155A			Table 3	V									
1N5156			Table 3	V									
thru 1N5157			Table 3	V									
1N5158			Table 1	4									
thru 1N5160			Table 1	4									
1N5163	S			S	35	1.0	200m		0.5n				
1N5164				S	35	1.0	300m		0.4n				
1N5165,A			Table 4	M									
1N5166,A			Table 4	M									
1N5167,A			Table 4	M									
1N5168			Table 4	M									
1N5169			Table 4	M									
1N5170	S	1N4001	1N4001	G	15	1.2	2.0	0.025	200				
1N5171	S	1N4002	1N4001	G	50	1.2	2.0	0.025	200				
1N5172	S	1N4002	1N4001	G	100	1.2	2.0	0.025	200				
1N5173	S	1N4004	1N4001	G	300	1.2	2.0	0.025	200				
1N5174	S	1N4004	1N4001	G	400	1.2	2.0	0.025	200				
1N5175	S	1N4005	1N4001	G	500	1.2	2.0	0.025	200				
1N5176	S	1N4005	1N4001	G	600	1.2	2.0	0.025	200				
1N5177	S	1N4006	1N4001	G	800	1.2	2.0	0.025	200				
1N5178	S	1N4007	1N4001	G	1000	1.2	2.0	0.025	200				
1N5179	S			S		2.8	1.0	50	200				
1N5180	S			G	100	1.25	4.0	100	100				
1N5181	S			G	4000		0.6	0.02					
1N5182	S			G	5000		0.6	0.02					
1N5183	S			G	7500		0.6	0.02					
1N5184	S			G	10000		0.6	0.02					
1N5185	S	MR850	MR850	G	50	1.1	3.0	0.100	80				
1N5185A	S	MR850	MR850	G	50	1.1	4.0	0.022	80				
1N5186	S	MR851	MR850	G	100	1.1	3.0	0.100	80				
1N5186A	S	MR851	MR850	G	100	1.1	4.0	0.022	80				
1N5187	S	MR852	MR850	G	200	1.1	3.0	0.100	80				
1N5187A	S	MR852	MR850	G	200	1.1	4.0	0.022	80				
1N5188	S	MR854	MR850	G	400	1.1	3.0	0.100	80				
1N5188A	S	MR854	MR850	G	400	1.1	4.0	0.022	80				
1N5189	S	MR856	MR850	G	500	1.1	3.0	0.100	80				
1N5189A	S	MR856	MR850	G	500	1.1	4.0	0.022	80				
1N5190	S	MR856	MR850	G	600	1.1	3.0	0.100	80				
1N5190A	S	MR856	MR850	G	600	1.1	4.0	0.022	80				
1N5197	S	MR501	MR501	G	50		2.0	0.1					
1N5198	S	MR501	MR501	G	100		2.0	0.1					
1N5199	S	MR502	MR501	G	200		2.0	0.1					
1N5200	S	MR504	MR501	G	400		2.0	0.1					
1N5201	S	MR506	MR501	G	600		2.0	0.1					
1N5206	S			G	400	1.1	2.0	0.003	25				
1N5207	S			G	400	1.25	4.0	0.005	100				
1N5211	S			G	200	1.2	1.0	0.2	50				
1N5212	S			G	400	1.2	1.0	0.2	50				
1N5213	S			G	600	1.2	1.0	0.2	50				
1N5214	S			G	800	1.2	0.75	0.2	50				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5215	S			G	200	1.2	1.0	0.2	50				
1N5216	S			G	400	1.2	1.0	0.2	50				
1N5217	S			G	600	1.2	1.0	0.2	50				
1N5218	S			G	800	1.2	0.75	0.2	50				
1N5219	S			S	30	1.0	50	50	0.002				
1N5220	S			S	30	1.2	50	50					
★1N5221	S		1N5221	Z						2.4	20	10	500m
★1N5221A	S		1N5221	Z						2.4	20	10	500m
★1N5221B	S		1N5221	Z						2.4	20	5.0	500m
★1N5222	S		1N5221	Z						2.5	20	10	500m
★1N5222A	S		1N5221	Z						2.5	20	10	500m
★1N5222B	S		1N5221	Z						2.5	20	5.0	500m
★1N5223	S		1N5221	Z						2.7	20	10	500m
★1N5223A	S		1N5221	Z						2.7	20	10	500m
★1N5223B	S		1N5221	Z						2.7	20	5.0	500m
★1N5224	S		1N5221	Z						2.8	20	10	500m
★1N5224A	S		1N5221	Z						2.8	20	10	500m
★1N5224B	S		1N5221	Z						2.8	20	5.0	500m
★1N5225	S		1N5221	Z						3.0	20	10	500m
★1N5225A	S		1N5221	Z						3.0	20	10	500m
★1N5225B	S		1N5221	Z						3.0	20	5.0	500m
★1N5226	S		1N5221	Z						3.3	20	10	500m
★1N5226A	S		1N5221	Z						3.3	20	10	500m
★1N5226B	S		1N5221	Z						3.3	20	5.0	500m
★1N5227	S		1N5221	Z						3.6	20	10	500m
★1N5227A	S		1N5221	Z						3.6	20	10	500m
★1N5227B	S		1N5221	Z						3.6	20	5.0	500m
★1N5228	S		1N5221	Z						3.9	20	10	500m
★1N5228A	S		1N5221	Z						3.9	20	10	500m
★1N5228B	S		1N5221	Z						3.9	20	5.0	500m
★1N5229	S		1N5221	Z						4.3	20	10	500m
★1N5229A	S		1N5221	Z						4.3	20	10	500m
★1N5229B	S		1N5221	Z						4.3	20	5.0	500m
★1N5230	S		1N5221	Z						4.7	20	10	500m
★1N5230A	S		1N5221	Z						4.7	20	10	500m
★1N5230B	S		1N5221	Z						4.7	20	5.0	500m
★1N5231	S		1N5221	Z						5.1	20	10	500m
★1N5231A	S		1N5221	Z						5.1	20	10	500m
★1N5231B	S		1N5221	Z						5.1	20	5.0	500m
★1N5232	S		1N5221	Z						5.6	20	10	500m
★1N5232A	S		1N5221	Z						5.6	20	10	500m
★1N5232B	S		1N5221	Z						5.6	20	5.0	500m
★1N5233	S		1N5221	Z						6.0	20	10	500m
★1N5233A	S		1N5221	Z						6.0	20	10	500m
★1N5233B	S		1N5221	Z						6.0	20	5.0	500m
★1N5234	S		1N5221	Z						6.2	20	10	500m
★1N5234A	S		1N5221	Z						6.2	20	10	500m
★1N5234B	S		1N5221	Z						6.2	20	5.0	500m
★1N5235	S		1N5221	Z						6.8	20	10	500m
★1N5235A	S		1N5221	Z						6.8	20	10	500m
★1N5235B	S		1N5221	Z						6.8	20	5.0	500m
★1N5236	S		1N5221	Z						7.5	20	10	500m
★1N5236A	S		1N5221	Z						7.5	20	10	500m
★1N5236B	S		1N5221	Z						7.5	20	5.0	500m
★1N5237	S		1N5221	Z						8.2	20	10	500m
★1N5237A	S		1N5221	Z						8.2	20	10	500m
★1N5237B	S		1N5221	Z						8.2	20	5.0	500m
★1N5238	S		1N5221	Z						8.7	20	10	500m
★1N5238A	S		1N5221	Z						8.7	20	10	500m
★1N5238B	S		1N5221	Z						8.7	20	5.0	500m
★1N5239	S		1N5221	Z						9.1	20	10	500m
★1N5239A	S		1N5221	Z						9.1	20	10	500m
★1N5239B	S		1N5221	Z						9.1	20	5.0	500m
★1N5240	S		1N5221	Z						10	20	10	500m
★1N5240A	S		1N5221	Z						10	20	10	500m
★1N5240B	S		1N5221	Z						10	20	5.0	500m
★1N5241	S		1N5221	Z						11	20	10	500m
★1N5241A	S		1N5221	Z						11	20	10	500m
★1N5241B	S		1N5221	Z						11	20	5.0	500m
★1N5242	S		1N5221	Z						12	20	10	500m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N5242A	S		1N5221	Z						12	20	10	500m
★1N5242B	S		1N5221	Z						12	20	5.0	500m
★1N5243	S		1N5221	Z						13	9.5	10	500m
★1N5243A	S		1N5221	Z						13	9.5	10	500m
★1N5243B	S		1N5221	Z						13	9.5	5.0	500m
★1N5244	S		1N5221	Z						14	9.0	10	500m
★1N5244A	S		1N5221	Z						14	9.0	10	500m
★1N5244B	S		1N5221	Z						14	9.0	5.0	500m
★1N5245	S		1N5221	Z						15	8.5	10	500m
★1N5245A	S		1N5221	Z						15	8.5	10	500m
★1N5245B	S		1N5221	Z						15	8.5	5.0	500m
★1N5246	S		1N5221	Z						16	7.8	10	500m
★1N5246A	S		1N5221	Z						16	7.8	10	500m
★1N5246B	S		1N5221	Z						16	7.8	5.0	500m
★1N5247	S		1N5221	Z						17	7.4	10	500m
★1N5247A	S		1N5221	Z						17	7.4	10	500m
★1N5247B	S		1N5221	Z						17	7.4	5.0	500m
★1N5248	S		1N5221	Z						18	7.0	10	500m
★1N5248A	S		1N5221	Z						18	7.0	10	500m
★1N5248B	S		1N5221	Z						18	7.0	5.0	500m
★1N5249	S		1N5221	Z						19	6.6	10	500m
★1N5249A	S		1N5221	Z						19	6.6	10	500m
★1N5249B	S		1N5221	Z						19	6.6	5.0	500m
★1N5250	S		1N5221	Z						20	6.2	10	500m
★1N5250A	S		1N5221	Z						20	6.2	10	500m
★1N5250B	S		1N5221	Z						20	6.2	5.0	500m
★1N5251	S		1N5221	Z						22	5.6	10	500m
★1N5251A	S		1N5221	Z						22	5.6	10	500m
★1N5251B	S		1N5221	Z						22	5.6	5.0	500m
★1N5252	S		1N5221	Z						24	5.2	10	500m
★1N5252A	S		1N5221	Z						24	5.2	10	500m
★1N5252B	S		1N5221	Z						24	5.2	5.0	500m
★1N5253	S		1N5221	Z						25	5.0	10	500m
★1N5253A	S		1N5221	Z						25	5.0	10	500m
★1N5253B	S		1N5221	Z						25	5.0	5.0	500m
★1N5254	S		1N5221	Z						27	4.6	10	500m
★1N5254A	S		1N5221	Z						27	4.6	10	500m
★1N5254B	S		1N5221	Z						27	4.6	5.0	500m
★1N5255	S		1N5221	Z						28	4.5	10	500m
★1N5255A	S		1N5221	Z						28	4.5	10	500m
★1N5255B	S		1N5221	Z						28	4.5	5.0	500m
★1N5256	S		1N5221	Z						30	4.2	10	500m
★1N5256A	S		1N5221	Z						30	4.2	10	500m
★1N5256B	S		1N5221	Z						30	4.2	5.0	500m
★1N5257	S		1N5221	Z						33	3.8	10	500m
★1N5257A	S		1N5221	Z						33	3.8	10	500m
★1N5257B	S		1N5221	Z						33	3.8	5.0	500m
★1N5258	S		1N5221	Z						36	3.4	10	500m
★1N5258A	S		1N5221	Z						36	3.4	10	500m
★1N5258B	S		1N5221	Z						36	3.4	5.0	500m
★1N5259	S		1N5221	Z						39	3.2	10	500m
★1N5259A	S		1N5221	Z						39	3.2	10	500m
★1N5259B	S		1N5221	Z						39	3.2	5.0	500m
★1N5260	S		1N5221	Z						43	3.0	10	500m
★1N5260A	S		1N5221	Z						43	3.0	10	500m
★1N5260B	S		1N5221	Z						43	3.0	5.0	500m
★1N5261	S		1N5221	Z						47	2.7	10	500m
★1N5261A	S		1N5221	Z						47	2.7	10	500m
★1N5261B	S		1N5221	Z						47	2.7	5.0	500m
★1N5262	S		1N5221	Z						51	2.5	10	500m
★1N5262A	S		1N5221	Z						51	2.5	10	500m
★1N5262B	S		1N5221	Z						51	2.5	5.0	500m
★1N5263	S		1N5221	Z						56	2.2	10	500m
★1N5263A	S		1N5221	Z						56	2.2	10	500m
★1N5263B	S		1N5221	Z						56	2.2	5.0	500m
★1N5264	S		1N5221	Z						60	2.1	10	500m
★1N5264A	S		1N5221	Z						60	2.1	10	500m
★1N5264B	S		1N5221	Z						60	2.1	5.0	500m
★1N5265	S		1N5221	Z						62	2.0	10	500m
★1N5265A	S		1N5221	Z						62	2.0	10	500m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N5265B	S		1N5221	Z						62	2.0	5.0	500m
★1N5266	S		1N5221	Z						68	1.8	10	500m
★1N5266A	S		1N5221	Z						68	1.8	10	500m
★1N5266B	S		1N5221	Z						68	1.8	5.0	500m
★1N5267	S		1N5221	Z						75	1.7	10	500m
★1N5267A	S		1N5221	Z						75	1.7	10	500m
★1N5267B	S		1N5221	Z						75	1.7	5.0	500m
★1N5268	S		1N5221	Z						82	1.5	10	500m
★1N5268A	S		1N5221	Z						82	1.5	10	500m
★1N5268B	S		1N5221	Z						82	1.5	5.0	500m
★1N5269	S		1N5221	Z						87	1.4	10	500m
★1N5269A	S		1N5221	Z						87	1.4	10	500m
★1N5269B	S		1N5221	Z						87	1.4	5.0	500m
★1N5270	S		1N5221	Z						91	1.4	10	500m
★1N5270A	S		1N5221	Z						91	1.4	10	500m
★1N5270B	S		1N5221	Z						91	1.4	5.0	500m
★1N5271	S		1N5221	Z						100	1.3	10	500m
★1N5271A	S		1N5221	Z						100	1.3	10	500m
★1N5271B	S		1N5221	Z						100	1.3	5.0	500m
★1N5272	S		1N5221	Z						110	1.1	10	500m
★1N5272A	S		1N5221	Z						110	1.1	10	500m
★1N5272B	S		1N5221	Z						110	1.1	5.0	500m
★1N5273	S		1N5221	Z						120	1.0	10	500m
★1N5273A	S		1N5221	Z						120	1.0	10	500m
★1N5273B	S		1N5221	Z						120	1.0	5.0	500m
★1N5274	S		1N5221	Z						130	0.95	10	500m
★1N5274A	S		1N5221	Z						130	0.95	10	500m
★1N5274B	S		1N5221	Z						130	0.95	5.0	500m
★1N5275	S		1N5221	Z						140	0.90	10	500m
★1N5275A	S		1N5221	Z						140	0.90	10	500m
★1N5275B	S		1N5221	Z						140	0.90	5.0	500m
★1N5276	S		1N5221	Z						150	0.85	10	500m
★1N5276A	S		1N5221	Z						150	0.85	10	500m
★1N5276B	S		1N5221	Z						150	0.85	5.0	500m
★1N5277	S		1N5221	Z						160	0.80	10	500m
★1N5277A	S		1N5221	Z						160	0.80	10	500m
★1N5277B	S		1N5221	Z						160	0.80	5.0	500m
★1N5278	S		1N5221	Z						170	0.74	10	500m
★1N5278A	S		1N5221	Z						170	0.74	10	500m
★1N5278B	S		1N5221	Z						170	0.74	5.0	500m
★1N5279	S		1N5221	Z						180	0.68	10	500m
★1N5279A	S		1N5221	Z						180	0.68	10	500m
★1N5279B	S		1N5221	Z						180	0.68	5.0	500m
★1N5280	S		1N5221	Z						190	0.66	10	500m
★1N5280A	S		1N5221	Z						190	0.66	10	500m
★1N5280B	S		1N5221	Z						190	0.66	5.0	500m
★1N5281	S		1N5221	Z						200	0.65	10	500m
★1N5281A	S		1N5221	Z						200	0.65	10	500m
★1N5281B	S		1N5221	Z						200	0.65	5.0	500m
1N5282	S			S	55	1.3	500m	0.1*	0.004				
1N5283				I									
thru													
1N5314				I									
1N5315	S			S	75	0.49	0.1m	0.05*	0.004				
1N5316	S			S	75	0.49	0.1m	0.05*	0.004				
1N5317	S			S	55	1.17	500m	0.1*	0.004				
1N5318	S			S	50	0.87	200m	0.1*	0.004				
1N5319	S			S	25	1.0	100m	100*	0.004				
1N5320	S			G	100		1.0		20				
1N5324	S			G	15000	24	0.010	0.025	0.75				
1N5326	S			G	100		12		200				
1N5329	S			G	100		0.135	0.150	10				
1N5330	S			G	100		0.540	0.150	15				
1N5331	S			G	1200		12		240				
1N5332	S			G	1200		35		500				
★1N5333	S		1N5333	Z						3.3	380	20	5.0W
★1N5333A	S		1N5333	Z						3.3	380	10	5.0W
★1N5333B	S		1N5333	Z						3.3	380	5	5.0W
★1N5334	S		1N5333	Z						3.6	350	20	5.0W
★1N5334A	S		1N5333	Z						3.6	350	10	5.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N5334B	S		1N5333	Z						3.6	350	5	5.0W
★1N5335	S		1N5333	Z						3.9	320	20	5.0W
★1N5335A	S		1N5333	Z						3.9	320	10	5.0W
★1N5335B	S		1N5333	Z						3.9	320	5	5.0W
★1N5336	S		1N5333	Z						4.3	290	20	5.0W
★1N5336A	S		1N5333	Z						4.3	290	10	5.0W
★1N5336B	S		1N5333	Z						4.3	290	5	5.0W
★1N5337	S		1N5333	Z						4.7	260	20	5.0W
★1N5337A	S		1N5333	Z						4.7	260	10	5.0W
★1N5337B	S		1N5333	Z						4.7	260	5	5.0W
★1N5338	S		1N5333	Z						5.1	240	20	5.0W
★1N5338A	S		1N5333	Z						5.1	240	10	5.0W
★1N5338B	S		1N5333	Z						5.1	240	5	5.0W
★1N5339	S		1N5333	Z						5.6	220	20	5.0W
★1N5339A	S		1N5333	Z						5.6	220	10	5.0W
★1N5339B	S		1N5333	Z						5.6	220	5	5.0W
★1N5340	S		1N5333	Z						6.0	200	20	5.0W
★1N5340A	S		1N5333	Z						6.0	200	10	5.0W
★1N5340B	S		1N5333	Z						6.0	200	5	5.0W
★1N5341	S		1N5333	Z						6.2	200	20	5.0W
★1N5341A	S		1N5333	Z						6.2	200	10	5.0W
★1N5341B	S		1N5333	Z						6.2	200	5	5.0W
★1N5342	S		1N5333	Z						6.8	175	20	5.0W
★1N5342A	S		1N5333	Z						6.8	175	10	5.0W
★1N5342B	S		1N5333	Z						6.8	175	5	5.0W
★1N5343	S		1N5333	Z						7.5	175	20	5.0W
★1N5343A	S		1N5333	Z						7.5	175	10	5.0W
★1N5343B	S		1N5333	Z						7.5	175	5	5.0W
★1N5344	S		1N5333	Z						8.2	150	20	5.0W
★1N5344A	S		1N5333	Z						8.2	150	10	5.0W
★1N5344B	S		1N5333	Z						8.2	150	5	5.0W
★1N5345	S		1N5333	Z						8.7	150	20	5.0W
★1N5345A	S		1N5333	Z						8.7	150	10	5.0W
★1N5345B	S		1N5333	Z						8.7	150	5	5.0W
★1N5346	S		1N5333	Z						9.1	150	20	5.0W
★1N5346A	S		1N5333	Z						9.1	150	10	5.0W
★1N5346B	S		1N5333	Z						9.1	150	5	5.0W
★1N5347	S		1N5333	Z						10	125	20	5.0W
★1N5347A	S		1N5333	Z						10	125	10	5.0W
★1N5347B	S		1N5333	Z						10	125	5	5.0W
★1N5348	S		1N5333	Z						11	125	20	5.0W
★1N5348A	S		1N5333	Z						11	125	10	5.0W
★1N5348B	S		1N5333	Z						11	125	5	5.0W
★1N5349	S		1N5333	Z						12	100	20	5.0W
★1N5349A	S		1N5333	Z						12	100	10	5.0W
★1N5349B	S		1N5333	Z						12	100	5	5.0W
★1N5350	S		1N5333	Z						13	100	20	5.0W
★1N5350A	S		1N5333	Z						13	100	10	5.0W
★1N5350B	S		1N5333	Z						13	100	5	5.0W
★1N5351	S		1N5333	Z						14	100	20	5.0W
★1N5351A	S		1N5333	Z						14	100	10	5.0W
★1N5351B	S		1N5333	Z						14	100	5	5.0W
★1N5352	S		1N5333	Z						15	75	20	5.0W
★1N5352A	S		1N5333	Z						15	75	10	5.0W
★1N5352B	S		1N5333	Z						15	75	5	5.0W
★1N5353	S		1N5333	Z						16	75	20	5.0W
★1N5353A	S		1N5333	Z						16	75	10	5.0W
★1N5353B	S		1N5333	Z						16	75	5	5.0W
★1N5354	S		1N5333	Z						17	70	20	5.0W
★1N5354A	S		1N5333	Z						17	70	10	5.0W
★1N5354B	S		1N5333	Z						17	70	5	5.0W
★1N5355	S		1N5333	Z						18	65	20	5.0W
★1N5355A	S		1N5333	Z						18	65	10	5.0W
★1N5355B	S		1N5333	Z						18	65	5	5.0W
★1N5356	S		1N5333	Z						19	65	20	5.0W
★1N5356A	S		1N5333	Z						19	65	10	5.0W
★1N5356B	S		1N5333	Z						19	65	5	5.0W
★1N5357	S		1N5333	Z						20	65	20	5.0W
★1N5357A	S		1N5333	Z						20	65	10	5.0W
★1N5357B	S		1N5333	Z						20	65	5	5.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_0 Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N5358	S		1N5333	Z						22	50	20	5.0W
★1N5358A	S		1N5333	Z						22	50	10	5.0W
★1N5358B	S		1N5333	Z						22	50	5	5.0W
★1N5359	S		1N5333	Z						24	50	20	5.0W
★1N5359A	S		1N5333	Z						24	50	10	5.0W
★1N5359B	S		1N5333	Z						24	50	5	5.0W
★1N5360	S		1N5333	Z						25	50	20	5.0W
★1N5360A	S		1N5333	Z						25	50	10	5.0W
★1N5360B	S		1N5333	Z						25	50	5	5.0W
★1N5361	S		1N5333	Z						27	50	20	5.0W
★1N5361A	S		1N5333	Z						27	50	10	5.0W
★1N5361B	S		1N5333	Z						27	50	5	5.0W
★1N5362	S		1N5333	Z						28	50	20	5.0W
★1N5362A	S		1N5333	Z						28	50	10	5.0W
★1N5362B	S		1N5333	Z						28	50	5	5.0W
★1N5363	S		1N5333	Z						30	40	20	5.0W
★1N5363A	S		1N5333	Z						30	40	10	5.0W
★1N5363B	S		1N5333	Z						30	40	5	5.0W
★1N5364	S		1N5333	Z						33	40	20	5.0W
★1N5364A	S		1N5333	Z						33	40	10	5.0W
★1N5364B	S		1N5333	Z						33	40	5	5.0W
★1N5365	S		1N5333	Z						36	30	20	5.0W
★1N5365A	S		1N5333	Z						36	30	10	5.0W
★1N5365B	S		1N5333	Z						36	30	5	5.0W
★1N5366	S		1N5333	Z						39	30	20	5.0W
★1N5366A	S		1N5333	Z						39	30	10	5.0W
★1N5366B	S		1N5333	Z						39	30	5	5.0W
★1N5367	S		1N5333	Z						43	30	20	5.0W
★1N5367A	S		1N5333	Z						43	30	10	5.0W
★1N5367B	S		1N5333	Z						43	30	5	5.0W
★1N5368	S		1N5333	Z						47	25	20	5.0W
★1N5368A	S		1N5333	Z						47	25	10	5.0W
★1N5368B	S		1N5333	Z						47	25	5	5.0W
★1N5369	S		1N5333	Z						51	25	20	5.0W
★1N5369A	S		1N5333	Z						51	25	10	5.0W
★1N5369B	S		1N5333	Z						51	25	5	5.0W
★1N5370	S		1N5333	Z						56	20	20	5.0W
★1N5370A	S		1N5333	Z						56	20	10	5.0W
★1N5370B	S		1N5333	Z						56	20	5	5.0W
★1N5371	S		1N5333	Z						60	20	20	5.0W
★1N5371A	S		1N5333	Z						60	20	10	5.0W
★1N5371B	S		1N5333	Z						60	20	5	5.0W
★1N5372	S		1N5333	Z						62	20	20	5.0W
★1N5372A	S		1N5333	Z						62	20	10	5.0W
★1N5372B	S		1N5333	Z						62	20	5	5.0W
★1N5373	S		1N5333	Z						68	20	20	5.0W
★1N5373A	S		1N5333	Z						68	20	10	5.0W
★1N5373B	S		1N5333	Z						68	20	5	5.0W
★1N5374	S		1N5333	Z						75	20	20	5.0W
★1N5374A	S		1N5333	Z						75	20	10	5.0W
★1N5374B	S		1N5333	Z						75	20	5	5.0W
★1N5375	S		1N5333	Z						82	15	20	5.0W
★1N5375A	S		1N5333	Z						82	15	10	5.0W
★1N5375B	S		1N5333	Z						82	15	5	5.0W
★1N5376	S		1N5333	Z						87	15	20	5.0W
★1N5376A	S		1N5333	Z						87	15	10	5.0W
★1N5376B	S		1N5333	Z						87	15	5	5.0W
★1N5377	S		1N5333	Z						91	15	20	5.0W
★1N5377A	S		1N5333	Z						91	15	10	5.0W
★1N5377B	S		1N5333	Z						91	15	5	5.0W
★1N5378	S		1N5333	Z						100	12	20	5.0W
★1N5378A	S		1N5333	Z						100	12	10	5.0W
★1N5378B	S		1N5333	Z						100	12	5	5.0W
★1N5379	S		1N5333	Z						110	12	20	5.0W
★1N5379A	S		1N5333	Z						110	12	10	5.0W
★1N5379B	S		1N5333	Z						110	12	5	5.0W
★1N5380	S		1N5333	Z						120	10	20	5.0W
★1N5380A	S		1N5333	Z						120	10	10	5.0W
★1N5380B	S		1N5333	Z						120	10	5	5.0W
★1N5381	S		1N5333	Z						130	10	20	5.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N5381A	S		1N5333	Z						130	10	10	5.0W
★1N5381B	S		1N5333	Z						130	10	5	5.0W
★1N5382	S		1N5333	Z						140	8.0	20	5.0W
★1N5382A	S		1N5333	Z						140	8.0	10	5.0W
★1N5382B	S		1N5333	Z						140	8.0	5	5.0W
★1N5383	S		1N5333	Z						150	8.0	20	5.0W
★1N5383A	S		1N5333	Z						150	8.0	10	5.0W
★1N5383B	S		1N5333	Z						150	8.0	5	5.0W
★1N5384	S		1N5333	Z						160	8.0	20	5.0W
★1N5384A	S		1N5333	Z						160	8.0	10	5.0W
★1N5384B	S		1N5333	Z						160	8.0	5	5.0W
★1N5385	S		1N5333	Z						170	8.0	20	5.0W
★1N5385A	S		1N5333	Z						170	8.0	10	5.0W
★1N5385B	S		1N5333	Z						170	8.0	5	5.0W
★1N5386	S		1N5333	Z						180	5.0	20	5.0W
★1N5386A	S		1N5333	Z						180	5.0	10	5.0W
★1N5386B	S		1N5333	Z						180	5.0	5	5.0W
★1N5387	S		1N5333	Z						190	5.0	20	5.0W
★1N5387A	S		1N5333	Z						190	5.0	10	5.0W
★1N5387B	S		1N5333	Z						190	5.0	5	5.0W
★1N5388	S		1N5333	Z						200	5.0	20	5.0W
★1N5388A	S		1N5333	Z						200	5.0	10	5.0W
★1N5388B	S		1N5333	Z						200	5.0	5	5.0W
1N5389	S			G	40,000	80	0.100	0.10	10				
1N5390				H									
1N5391	S	MR501	MR501	G	50		1.5		50				
1N5392	S	MR501	MR501	G	100		1.5		50				
1N5393	S	MR502	MR501	G	200		1.5		50				
1N5394	S	MR504	MR501	G	300		1.5		50				
1N5395	S	MR504	MR501	G	400		1.5		50				
1N5396	S	MR506	MR501	G	500		1.5		50				
1N5397	S	MR506	MR501	G	600		1.5		50				
1N5398	S	MR508	MR501	G	800		1.5		50				
1N5399	s	MR510	MR501	G	1000		1.5		50				
1N5400	S	MR501	MR501	G	50		3.0		200				
1N5401	S	MR501	MR501	G	100		3.0		200				
1N5402	S	MR502	MR501	G	200		3.0		200				
1N5403	S	MR504	MR501	G	300		3.0		200				
1N5404	S	MR504	MR501	G	400		3.0		200				
1N5405	S	MR506	MR501	G	500		3.0		200				
1N5406	S	MR506	MR501	G	600		3.0		200				
1N5407	S	MR508	MR501	G	800		3.0		200				
1N5408	S	MR510	MR501	G	1000		3.0		200				
1N5409	S			G	175		40		1000				
1N5410	S			G	175		12		200				
1N5411	S			3									
1N5412	S			S	30	0.500	0.1m	100n	0.002				
1N5413	S			S	55	0.500	0.1m	100n	0.002				
1N5414	S			S	75	0.500	0.1m	100n	0.002				
1N5415	S			G	50				200				
1N5416	S			G	100				200				
1N5417	S			G	200				200				
1N5418	S			G	400				200				
1N5419	S			G	500				200				
1N5420	S			G	600				200				
1N5421			Table 3	V									
thru													
1N5425			Table 3	V									
1N5426	S			S		1.0	40m	1.0*					
1N5427	S			S		1.0	10m	0.10*	0.004				
1N5428	S			S		1.0	100m	0.10*	0.050				
1N5429	S			S		1.0	200m	0.005*					
1N5430	S			S		1.0	200m	0.10*	0.004				
1N5431	S			S		1.3	500m	0.10*	0.004				
1N5432	S			S		1.3	50m	0.050*	0.75n				
1N5433	S	MR856	MR850	G	600		2.0		25				
1N5434	S	MR856	MR850	G	600		2.0		60				
1N5435	S	MR856	MR850	G	600		12		200				
1N5436				M									
1N5437				M									

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5438			Table 4	M									
1N5439			Table 3	V									
thru													
1N5476			Table 3	V									
1N5477	S			G	6000		0.6	0.350	80				
1N5478	S			G	7200		0.6	0.350	80				
1N5479	S			G	8400		0.6	0.350	80				
1N5480	S			G	9600		0.6	0.350	80				
1N5481	S			G	12000		0.6	0.350	80				
1N5482	S			G	2400		1.0	0.350	80				
1N5483	S			G	3600		1.0	0.350	80				
1N5484	S			G	4800		1.0	0.350	80				
1N5485	S			G	6000		1.0	0.350	80				
★1N5518	S		1N5518	Z						3.3	20	20	40m
★1N5518A	S		1N5518	Z						3.3	20	10	40m
★1N5518B	S		1N5518	Z						3.3	20	5.0	40m
1N5518C	S			Z						3.3	20	2.0	40m
1N5518D	S			Z						3.3	20	1.0	400m
★1N5519	S		1N5518	Z						3.6	20	20	400m
★1N5519A	S		1N5518	Z						3.6	20	10	400m
★1N5519B	S		1N5518	Z						3.6	20	5.0	400m
1N5519C	S			Z						3.6	20	2.0	400m
1N5519D	S			Z						3.6	20	1.0	400m
★1N5520	S		1N5518	Z						3.9	20	20	400m
★1N5520A	S		1N5518	Z						3.9	20	10	400m
★1N5520B	S		1N5518	Z						3.9	20	5.0	400m
1N5520C	S			Z						3.9	20	2.0	400m
1N5520D	S			Z						3.9	20	1.0	400m
★1N5521	S		1N5518	Z						4.3	20	20	400m
★1N5521A	S		1N5518	Z						4.3	20	10	400m
★1N5521B	S		1N5518	Z						4.3	20	5.0	400m
1N5521C	S			Z						4.3	20	2.0	400m
1N5521D	S			Z						4.3	20	1.0	400m
★1N5522	S		1N5518	Z						4.7	10	20	400m
★1N5522A	S		1N5518	Z						4.7	10	10	400m
★1N5522B	S		1N5518	Z						4.7	10	5.0	400m
1N5522C	S			Z						4.7	10	2.0	400m
1N5522D	S			Z						4.7	10	1.0	400m
★1N5523	S		1N5518	Z						5.1	5.0	20	400m
★1N5523A	S		1N5518	Z						5.1	5.0	10	400m
★1N5523B	S		1N5518	Z						5.1	5.0	5.0	400m
1N5523C	S			Z						5.1	5.0	2.0	400m
1N5523D	S			Z						5.1	5.0	1.0	400m
★1N5524	S		1N5518	Z						5.6	3.0	20	400m
★1N5524A	S		1N5518	Z						5.6	3.0	10	400m
★1N5524B	S		1N5518	Z						5.6	3.0	5.0	400m
1N5524C	S			Z						5.6	3.0	2.0	400m
1N5524D	S			Z						5.6	3.0	1.0	400m
★1N5525	S		1N5518	Z						6.2	1.0	20	400m
★1N5525A	S		1N5518	Z						6.2	1.0	10	400m
★1N5525B	S		1N5518	Z						6.2	1.0	5.0	400m
1N5525C	S			Z						6.2	1.0	2.0	400m
1N5525D	S			Z						6.2	1.0	1.0	400m
★1N5526	S		1N5518	Z						6.8	1.0	20	400m
★1N5526A	S		1N5518	Z						6.8	1.0	10	400m
★1N5526B	S		1N5518	Z						6.8	1.0	5.0	400m
1N5526C	S			Z						6.8	1.0	2.0	400m
1N5526D	S			Z						6.8	1.0	1.0	400m
★1N5527	S		1N5518	Z						7.5	1.0	20	400m
★1N5527A	S		1N5518	Z						7.5	1.0	10	400m
★1N5527B	S		1N5518	Z						7.5	1.0	5.0	400m
1N5527C	S			Z						7.5	1.0	2.0	400m
1N5527D	S			Z						7.5	1.0	1.0	400m
★1N5528	S		1N5518	Z						8.2	1.0	20	400m
★1N5528A	S		1N5518	Z						8.2	1.0	10	400m
★1N5528B	S		1N5518	Z						8.2	1.0	5.0	400m
1N5528C	S			Z						8.2	1.0	2.0	400m
1N5528D	S			Z						8.2	1.0	1.0	400m
★1N5529	S		1N5518	Z						9.1	1.0	20	400m
★1N5529A	S		1N5518	Z						9.1	1.0	10	400m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
★1N5529B	S		1N5518	Z						9.1	1.0	5.0	400m
1N5529C	S			Z						9.1	1.0	2.0	400m
1N5529D	S			Z						9.1	1.0	1.0	400m
★1N5530	S		1N5518	Z						10	1.0	20	400m
★1N5530A	S		1N5518	Z						10	1.0	10	400m
★1N5530B	S		1N5518	Z						10	1.0	5.0	400m
1N5530C	S			Z						10	1.0	2.0	400m
1N5530D	S			Z						10	1.0	1.0	400m
★1N5531	S		1N5518	Z						11	1.0	20	400m
★1N5531A	S		1N5518	Z						11	1.0	10	400m
★1N5531B	S		1N5518	Z						11	1.0	5.0	400m
1N5531C	S			Z						11	1.0	2.0	400m
1N5531D	S			Z						11	1.0	1.0	400m
★1N5532	S		1N5518	Z						12	1.0	20	400m
★1N5532A	S		1N5518	Z						12	1.0	10	400m
★1N5532B	S		1N5518	Z						12	1.0	5.0	400m
1N5532C	S			Z						12	1.0	2.0	400m
1N5532D	S			Z						12	1.0	1.0	400m
★1N5533	S		1N5518	Z						13	1.0	20	400m
★1N5533A	S		1N5518	Z						13	1.0	10	400m
★1N5533B	S		1N5518	Z						13	1.0	5.0	400m
1N5533C	S			Z						13	1.0	2.0	400m
1N5533D	S			Z						13	1.0	1.0	400m
★1N5534	S		1N5518	Z						14	1.0	20	400m
★1N5534A	S		1N5518	Z						14	1.0	10	400m
★1N5534B	S		1N5518	Z						14	1.0	5.0	400m
1N5534C	S			Z						14	1.0	2.0	400m
1N5534D	S			Z						14	1.0	1.0	400m
★1N5535	S		1N5518	Z						15	1.0	20	400m
★1N5535A	S		1N5518	Z						15	1.0	10	400m
★1N5535B	S		1N5518	Z						15	1.0	5.0	400m
1N5535C	S			Z						15	1.0	2.0	400m
1N5535D	S			Z						15	1.0	1.0	400m
★1N5536	S		1N5518	Z						16	1.0	20	400m
★1N5536A	S		1N5518	Z						16	1.0	10	400m
★1N5536B	S		1N5518	Z						16	1.0	5.0	400m
1N5536C	S			Z						16	1.0	2.0	400m
1N5536D	S			Z						16	1.0	1.0	400m
★1N5537	S		1N5518	Z						17	1.0	20	400m
★1N5537A	S		1N5518	Z						17	1.0	10	400m
★1N5537B	S		1N5518	Z						17	1.0	5.0	400m
1N5537C	S			Z						17	1.0	2.0	400m
1N5537D	S			Z						17	1.0	1.0	400m
★1N5538	S		1N5518	Z						18	1.0	20	400m
★1N5538A	S		1N5518	Z						18	1.0	10	400m
★1N5538B	S		1N5518	Z						18	1.0	5.0	400m
1N5538C	S			Z						18	1.0	2.0	400m
1N5538D	S			Z						18	1.0	1.0	400m
★1N5539	S		1N5518	Z						19	1.0	20	400m
★1N5539A	S		1N5518	Z						19	1.0	10	400m
★1N5539B	S		1N5518	Z						19	1.0	5.0	400m
1N5539C	S			Z						19	1.0	2.0	400m
1N5539D	S			Z						19	1.0	1.0	400m
★1N5540	S		1N5518	Z						20	1.0	20	400m
★1N5540A	S		1N5518	Z						20	1.0	10	400m
★1N5540B	S		1N5518	Z						20	1.0	5.0	400m
1N5540C	S			Z						20	1.0	2.0	400m
1N5540D	S			Z						20	1.0	1.0	400m
★1N5541	S		1N5518	Z						22	1.0	20	400m
★1N5541A	S		1N5518	Z						22	1.0	10	400m
★1N5541B	S		1N5518	Z						22	1.0	5.0	400m
1N5541C	S			Z						22	1.0	2.0	400m
1N5541D	S			Z						22	1.0	1.0	400m
★1N5542	S		1N5518	Z						24	1.0	20	400m
★1N5542A	S		1N5518	Z						24	1.0	10	400m
★1N5542B	S		1N5518	Z						24	1.0	5.0	400m
1N5542C	S			Z						24	1.0	2.0	400m
1N5542D	S			Z						24	1.0	1.0	400m
★1N5543	S		1N5518	Z						25	1.0	20	400m
★1N5543A	S		1N5518	Z						25	1.0	10	400m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS V_{RWM} Volts	RECTIFIERS V_F Volts	RECTIFIERS I_O Amp	RECTIFIERS I_R mA	RECTIFIERS I_{FSM} Amp	ZENER DIODES V_Z Nom Volts	ZENER DIODES I_{ZT} mA	ZENER DIODES Tol V_Z ±%	ZENER DIODES P_D
					SIGNAL DIODES PRV Volts	SIGNAL DIODES V_F Volts @	SIGNAL DIODES I_F	SIGNAL DIODES I_R	SIGNAL DIODES t_{rr} µs	REFERENCE DIODES V_Z Nom Volts	REFERENCE DIODES T_C %/°C	REFERENCE DIODES I_{ZT} mA	REFERENCE DIODES Temp Range °C
★1N5543B	S		1N5518	Z						25	1.0	5.0	400m
1N5543C	S			Z						25	1.0	2.0	400m
1N5543D	S			Z						25	1.0	1.0	400m
★1N5544	S		1N5518	Z						28	1.0	20	400m
★1N5544A	S		1N5518	Z						28	1.0	10	400m
★1N5544B	S		1N5518	Z						28	1.0	5.0	400m
1N5544C	S			Z						28	1.0	2.0	400m
1N5544D	S			Z						28	1.0	1.0	400m
★1N5545	S		1N5518	Z						30	1.0	20	400m
★1N5545A	S		1N5518	Z						30	1.0	10	400m
★1N5545B	S		1N5518	Z						30	1.0	5.0	400m
1N5545C	S			Z						30	1.0	2.0	400m
1N5545D	S			Z						30	1.0	1.0	400m
★1N5546	S		1N5518	Z						33	1.0	20	400m
★1N5546A	S		1N5518	Z						33	1.0	10	400m
★1N5546B	S		1N5518	Z						33	1.0	5.0	400m
1N5546C	S			Z						33	1.0	2.0	400m
1N5546D	S			Z						33	1.0	1.0	400m
1N5550	S	MR502	MR501	G	200	1.0	3.0	0.025	150				
1N5551	S	MR504	MR501	G	400	1.0	3.0	0.025	150				
1N5552	S	MR506	MR501	G	600	1.0	3.0	0.025	150				
1N5553	S	MR508	MR501	G	800	1.1	3.0	0.025	150				
1N5554	S	MR510	MR501	G	1000	1.1	3.0	0.025	150				
1N5555 thru			Table 2	P									
1N5558			Table 2	P									
1N5559	S			Z						6.8	37	20	1.0W
1N5559A	S			Z						6.8	37	10	1.0W
1N5559B	S			Z						6.8	37	5.0	1.0W
1N5560	S			Z						7.5	34	20	1.0W
1N5560A	S			Z						7.5	34	10	1.0W
1N5560B	S			Z						7.5	34	5.0	1.0W
1N5561	S			Z						8.2	31	20	1.0W
1N5561A	S			Z						8.2	31	10	1.0W
1N5561B	S			Z						8.2	31	5.0	1.0W
1N5562	S			Z						9.1	28	20	1.0W
1N5562A	S			Z						9.1	28	10	1.0W
1N5562B	S			Z						9.1	28	5.0	1.0W
1N5563	S			Z						10	25	20	1.0W
1N5563A	S			Z						10	25	10	1.0W
1N5563B	S			Z						10	25	5.0	1.0W
1N5564	S			Z						11	23	20	1.0W
1N5564A	S			Z						11	23	10	1.0W
1N5564B	S			Z						11	23	5.0	1.0W
1N5565	S			Z						12	21	20	1.0W
1N5565A	S			Z						12	21	10	1.0W
1N5565B	S			Z						12	21	5.0	1.0W
1N5566	S			Z						13	19	20	1.0W
1N5566A	S			Z						13	19	10	1.0W
1N5566B	S			Z						13	19	5.0	1.0W
1N5567	S			Z						15	17	20	1.0W
1N5567A	S			Z						15	17	10	1.0W
1N5567B	S			Z						15	17	5.0	1.0W
1N5568	S			Z						16	15	20	1.0W
1N5568A	S			Z						16	15	10	1.0W
1N5568B	S			Z						16	15	5.0	1.0W
1N5569	S			Z						18	14	20	1.0W
1N5569A	S			Z						18	14	10	1.0W
1N5569B	S			Z						18	14	5.0	1.0W
1N5570	S			Z						20	12	20	1.0W
1N5570A	S			Z						20	12	10	1.0W
1N5570B	S			Z						20	12	5.0	1.0W
1N5571	S			Z						22	11	20	1.0W
1N5571A	S			Z						22	11	10	1.0W
1N5571B	S			Z						22	11	5.0	1.0W
1N5572	S			Z						24	10	20	1.0W
1N5572A	S			Z						24	10	10	1.0W
1N5572B	S			Z						24	10	5.0	1.0W
1N5573	S			Z						27	9.5	20	1.0W
1N5573A	S			Z						27	9.5	10	1.0W

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5573B	S			Z						27	9.5	5.0	1.0W
1N5574	S			Z						30	8.5	20	1.0W
1N5574A	S			Z						30	8.5	10	1.0W
1N5574B	S			Z						30	8.5	5.0	1.0W
1N5575	S			Z						33	7.5	20	1.0W
1N5575A	S			Z						33	7.5	10	1.0W
1N5575B	S			Z						33	7.5	5.0	1.0W
1N5576	S			Z						36	7.0	20	1.0W
1N5576A	S			Z						36	7.0	10	1.0W
1N5576B	S			Z						36	7.0	5.0	1.0W
1N5577	S			Z						39	6.5	20	1.0W
1N5577A	S			Z						39	6.5	10	1.0W
1N5577B	S			Z						39	6.5	5.0	1.0W
1N5578	S			Z						43	6.0	20	1.0W
1N5578A	S			Z						43	6.0	10	1.0W
1N5578B	S			Z						43	6.0	5.0	1.0W
1N5579	S			Z						47	5.5	20	1.0W
1N5579A	S			Z						47	5.5	10	1.0W
1N5579B	S			Z						47	5.5	5.0	1.0W
1N5580	S			Z						51	5.0	20	1.0W
1N5580A	S			Z						51	5.0	10	1.0W
1N5580B	S			Z						51	5.0	5.0	1.0W
1N5581	S			Z						56	4.5	20	1.0W
1N5581A	S			Z						56	4.5	10	1.0W
1N5581B	S			Z						56	4.5	5.0	1.0W
1N5582	S			Z						62	4.0	20	1.0W
1N5582A	S			Z						62	4.0	10	1.0W
1N5582B	S			Z						62	4.0	5.0	1.0W
1N5583	S			Z						68	3.7	20	1.0W
1N5583A	S			Z						68	3.7	10	1.0W
1N5583B	S			Z						68	3.7	5.0	1.0W
1N5584	S			Z						75	3.3	20	1.0W
1N5584A	S			Z						75	3.3	10	1.0W
1N5584B	S			Z						75	3.3	5.0	1.0W
1N5585	S			Z						82	3.0	20	1.0W
1N5585A	S			Z						82	3.0	10	1.0W
1N5585B	S			Z						82	3.0	5.0	1.0W
1N5586	S			Z						91	2.8	20	1.0W
1N5586A	S			Z						91	2.8	10	1.0W
1N5586B	S			Z						91	2.8	5.0	1.0W
1N5587	S			Z						100	2.5	20	1.0W
1N5587A	S			Z						100	2.5	10	1.0W
1N5587B	S			Z						100	2.5	5.0	1.0W
1N5588	S			Z						110	2.3	20	1.0W
1N5588A	S			Z						110	2.3	10	1.0W
1N5588B	S			Z						110	2.3	5.0	1.0W
1N5589	S			Z						120	2.0	20	1.0W
1N5589A	S			Z						120	2.0	10	1.0W
1N5589B	S			Z						120	2.0	5.0	1.0W
1N5590	S			Z						130	1.9	20	1.0W
1N5590A	S			Z						130	1.9	10	1.0W
1N5590B	S			Z						130	1.9	5.0	1.0W
1N5591	S			Z						150	1.7	20	1.0W
1N5591A	S			Z						150	1.7	10	1.0W
1N5591B	S			Z						150	1.7	5.0	1.0W
1N5592	S			Z						160	1.6	20	1.0W
1N5592A	S			Z						160	1.6	10	1.0W
1N5592B	S			Z						160	1.6	5.0	1.0W
1N5593	S			Z						180	1.4	20	1.0W
1N5593A	S			Z						180	1.4	10	1.0W
1N5593B	S			Z						180	1.4	5.0	1.0W
1N5594	S			Z						200	1.2	20	1.0W
1N5594A	S			Z						200	1.2	10	1.0W
1N5594B	S			Z						200	1.2	5.0	1.0W
1N5595	S			G	5000	7.4	1.15	0.30	30				
1N5596	S			G	7500	11	0.87	0.30	30				
1N5597	S			G	10,000	14.5	0.70	0.30	30				
1N5598	S			G	15,000	23	0.47	0.30	30				
1N5599	S			G	2500	3.7	2.1	0.75	100				
1N5600	S			G	5000	7.4	1.4	0.75	100				

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5601	S			G	7500	11	0.92	0.75	100				
1N5602	S			G	2500	5.0	4.6	1.0	200				
1N5603	S			G	5000	9.0	3.5	1.0	200				
1N5604	S			G	7500	12	2.3	1.0	200				
1N5605	S			S	70	1.0	20m	25n					
1N5606	S			S	150	1.0	7.0m	25n					
1N5607	S			S	200	1.0	3.0m	25n					
1N5608	S			S	120	1.0	100m	50n					
1N5609	S			S	120	1.0	6.0m	5.0*					
1N5610			Table 2	P									
thru													
1N5613			Table 2	P									
1N5614	S			G	200	1.2	1.0	0.0025	50				
1N5615	S			G	200	1.2	1.0	0.0025	50				
1N5616	S			G	400	1.2	1.0	0.0025	50				
1N5617	S			G	400	1.2	1.0	0.0025	50				
1N5618	S			G	600	1.2	1.0	0.0025	50				
1N5619	S			G	600	1.2	1.0	0.0025	50				
1N5620	S			G	800	1.2	1.0	0.0025	50				
1N5621	S			G	800	1.2	1.0	0.0025	50				
1N5622	S			G	1000	1.2	1.0	0.0025	50				
1N5623	S			G	1000	1.2	1.0	0.0025	50				
1N5624	S	MR502	MR501	G	200	0.95	3.0	0.3	125				
1N5625	S	MR504	MR501	G	400	0.95	3.0	0.3	125				
1N5626	S	MR506	MR501	G	600	0.95	3.0	0.3	125				
1N5627	S	MR508	MR501	G	800	0.95	3.0	0.3	125				
1N5629,A			Table 2	P									
thru													
1N5665,A			Table 2	P									
1N5666A	S			Z						1.8	1.0	10	250m
1N5667A	S			Z						2.0	1.0	10	250m
1N5668A	S			Z						2.2	1.0	10	250m
1N5669A	S			Z						2.4	1.0	10	250m
1N5670A	S			Z						2.7	1.0	10	250m
1N5671A	S			Z						3.0	1.0	10	250m
1N5672A	S			Z						3.3	1.0	10	250m
1N5673A	S			Z						3.6	1.0	10	250m
1N5674A	S			Z						3.9	1.0	10	250m
1N5675A	S			Z						4.3	1.0	10	250m
1N5676A	S			Z						4.7	1.0	10	250m
1N5677A	S			Z						5.1	1.0	10	250m
1N5678A	S			Z						5.6	1.0	10	250m
1N5679	S			G	50	1.1	1.0	0.01	50				
1N5680	S			G	100	1.1	1.0	0.01	50				
1N5711				J									
thru													
1N5713													
1N5720	S			S	30	1.0	50m	500n	0.01				
1N5721	S			S	15	1.0	50m	500n	0.01				
1N5726	S			S	60	1.1	500m	200n	0.01				
1N5727	S			S	50	1.1	500m	100n	0.01				
1N5728B	S			Z						4.7	10	5.0	400m
1N5729B	S			Z						5.1	10	5.0	400m
1N5730B	S			Z						5.6	10	5.0	400m
1N5731B	S			Z						6.2	10	5.0	400m
1N5732B	S			Z						6.8	10	5.0	400m
1N5733B	S			Z						7.5	10	5.0	400m
1N5734B	S			Z						8.2	10	5.0	400m
1N5735B	S			Z						9.1	10	5.0	400m
1N5736B	S			Z						10	10	5.0	400m
1N5737B	S			Z						11	5.0	5.0	400m
1N5738B	S			Z						12	5.0	5.0	400m
1N5739B	S			Z						13	5.0	5.0	400m
1N5740B	S			Z						15	5.0	5.0	400m
1N5741B	S			Z						16	5.0	5.0	400m
1N5742B	S			Z						18	5.0	5.0	400m
1N5743B	S			Z						20	5.0	5.0	400m
1N5744B	S			Z						22	5.0	5.0	400m
1N5745B	S			Z						24	5.0	5.0	400m
1N5746B	S			Z						27	2.0	5.0	400m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	ZENER DIODES V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	REFERENCE DIODES V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5747B	S			Z						30	2.0	5.0	400m
1N5748B	S			Z						33	2.0	5.0	400m
1N5749B	S			Z						36	2.0	5.0	400m
1N5750B	S			Z						39	2.0	5.0	400m
1N5751B	S			Z						43	2.0	5.0	400m
1N5752B	S			Z						47	2.0	5.0	400m
1N5753B	S			Z						51	2.0	5.0	400m
1N5754B	S			Z						56	2.0	5.0	400m
1N5755B	S			Z						62	2.0	5.0	400m
1N5756B	S			Z						68	2.0	5.0	400m
1N5757B	S			Z						75	2.0	5.0	400m
1N5763	S			G	33	1.2	300	10	4500				
1N5764			Table 4	M									
1N5765				E									
1N5766	S			S	110	1.75	30	2.0*	400n				
1N5767	S			S		1.0	100m	1.0*					
1N5768				A									
thru													
1N5775				A									
1N5779			Table 1	4									
thru													
1N5793			Table 1	4									
1N5794	S	1N4001	1N4001	G	50	1.0	1.0	30					
1N5795	S	1N4002	1N4001	G	100	1.0	1.0	30					
1N5796	S	1N4003	1N4001	G	200	1.0	1.0	30					
1N5797	S	1N4004	1N4001	G	400	1.0	1.0	30					
1N5798	S	1N4005	1N4001	G	600	1.0	1.0	30					
1N5799	S	1N4006	1N4001	G	800	1.0	1.0	30					
1N5800	S	1N4007	1N4001	G	1000	1.0	1.0	30					
1N5801				E									
1N5802	S	MR850	MR850	G	50	0.8	2.5	2.0	35				
1N5803	S	MR851	MR850	G	75	0.8	2.5	2.0	35				
1N5804	S	MR851	MR850	G	100	0.8	2.5	2.0	35				
1N5805	S	MR852	MR850	G	125	0.8	2.5	2.0	35				
1N5806	S	MR852	MR850	G	150	0.8	2.5	2.0	35				
1N5807	S	MR850	MR820	G	50	0.7	6.0	3.0	125				
1N5808	S	MR821	MR820	G	75	0.7	6.0	3.0	125				
1N5809	S	MR821	MR820	G	100	0.7	6.0	3.0	125				
1N5810	S	MR822	MR820	G	125	0.7	6.0	3.0	125				
1N5811	S	MR822	MR820	G	150	0.7	6.0	3.0	125				
1N5812	S	1N3899	1N3899	G	50	0.85	20	10	250				
1N5813	S	1N3900	1N3899	G	75	0.85	20	10	250				
1N5814	S	1N3900	1N3899	G	100	0.85	20	10	250				
1N5815	S	1N3901	1N3899	G	125	0.85	20	10	250				
1N5816	S	1N3901	1N3899	G	150	0.85	20	10	250				
1N5817	S			G	20		1.0		100				
1N5818	S			G	30		1.0		100				
1N5819	S			G	40		1.0		100				
1N5820	S			G	20		3.0		300				
1N5821	S			G	30		3.0		300				
1N5822	S			G	40		3.0		300				
★1N5823	S		1N5823	G	20		15	10	500				
★1N5824	S		1N5823	G	30		15	10	500				
★1N5825	S		1N5823	G	40		15	10	500				
★1N5826	S		1N5826	G	20	0.67	15	10	500				
★1N5827	S		1N5826	G	30	0.77	15	10	500				
★1N5828	S		1N5826	G	40	0.87	15	10	500				
★1N5829	S		1N5829	G	20	0.72	25	20	800				
★1N5830	S		1N5829	G	30	0.77	25	20	800				
★1N5831	S		1N5829	G	40	0.82	25	20	800				
★1N5832	S		1N5832	G	20	0.98	40	20	800				
★1N5833	S		1N5832	G	30	1.08	40	20	800				
★1N5834	S		1N5832	G	40	1.18	40	20	800				
1N5837A	S			Z						2.4	20	10	500m
1N5837B	S			Z						2.4	20	5.0	500m
1N5838A	S			Z						2.5	20	10	500m
1N5838B	S			Z						2.5	20	5.0	500m
1N5839A	S			Z						2.7	20	10	500m
1N5839B	S			Z						2.7	20	5.0	500m
1N5840A	S			Z						2.8	20	10	500m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts	@ I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5840B	S			Z						2.8	20	5.0	500m
1N5841A	S			Z						3.0	20	10	500m
1N5841B	S			Z						3.0	20	5.0	500m
1N5842A	S			Z						3.3	20	10	500m
1N5842B	S			Z						3.3	20	5.0	500m
1N5843A	S			Z						3.6	20	10	500m
1N5843B	S			Z						3.6	20	5.0	500m
1N5844A	S			Z						3.9	20	10	500m
1N5844B	S			Z						3.9	20	5.0	500m
1N5845A	S			Z						4.3	20	10	500m
1N5845B	S			Z						4.3	20	5.0	500m
1N5846A	S			Z						4.7	20	10	500m
1N5846B	S			Z						4.7	20	5.0	500m
1N5847A	S			Z						5.1	20	10	500m
1N5847B	S			Z						5.1	20	5.0	500m
1N5848A	S			Z						5.6	20	10	500m
1N5848B	S			Z						5.6	20	5.0	500m
1N5849A	S			Z						6.0	20	10	500m
1N5849B	S			Z						6.0	20	5.0	500m
1N5850A	S			Z						6.2	20	10	500m
1N5850B	S			Z						6.2	20	5.0	500m
1N5851A	S			Z						6.8	20	10	500m
1N5851B	S			Z						6.8	20	5.0	500m
1N5852A	S			Z						7.5	20	10	500m
1N5852B	S			Z						7.5	20	5.0	500m
1N5853A	S			Z						8.2	20	10	500m
1N5853B	S			Z						8.2	20	5.0	500m
1N5854A	S			Z						8.7	20	10	500m
1N5854B	S			Z						8.7	20	5.0	500m
1N5855A	S			Z						9.1	20	10	500m
1N5855B	S			Z						9.1	20	5.0	500m
1N5856A	S			Z						10	20	10	500m
1N5856B	S			Z						10	20	5.0	500m
1N5857A	S			Z						11	20	10	500m
1N5857B	S			Z						11	20	5.0	500m
1N5858A	S			Z						12	20	10	500m
1N5858B	S			Z						12	20	5.0	500m
1N5859A	S			Z						13	9.5	10	500m
1N5859B	S			Z						13	9.5	5.0	500m
1N5860A	S			Z						14	9.0	10	500m
1N5860B	S			Z						14	9.0	5.0	500m
1N5861A	S			Z						15	8.5	10	500m
1N5861B	S			Z						15	8.5	5.0	500m
1N5862A	S			Z						16	7.8	10	500m
1N5862B	S			Z						16	7.8	5.0	500m
1N5863A	S			Z						17	7.4	10	500m
1N5863B	S			Z						17	7.4	5.0	500m
1N5864A	S			Z						18	7.0	10	500m
1N5864B	S			Z						18	7.0	5.0	500m
1N5865A	S			Z						19	6.6	10	500m
1N5865B	S			Z						19	6.6	5.0	500m
1N5866A	S			Z						20	6.2	10	500m
1N5866B	S			Z						20	6.2	5.0	500m
1N5867A	S			Z						22	5.6	10	500m
1N5867B	S			Z						22	5.6	5.0	500m
1N5868A	S			Z						24	5.2	10	500m
1N5868B	S			Z						24	5.2	5.0	500m
1N5869A	S			Z						25	5.0	10	500m
1N5869B	S			Z						25	5.0	5.0	500m
1N5870A	S			Z						27	4.6	10	500m
1N5870B	S			Z						27	4.6	5.0	500m
1N5871A	S			Z						28	4.5	10	500m
1N5871B	S			Z						28	4.5	5.0	500m
1N5872A	S			Z						30	4.2	10	500m
1N5872B	S			Z						30	4.2	5.0	500m
1N5873A	S			Z						33	3.8	10	500m
1N5873B	S			Z						33	3.8	5.0	500m
1N5874A	S			Z						36	3.4	10	500m
1N5874B	S			Z						36	3.4	5.0	500m
1N5875A	S			Z						39	3.2	10	500m

TYPE NO.	MATERIAL	REPLACEMENT	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1N5875B	S			Z						39	3.2	5.0	500m
1N5876A	S			Z						43	3.0	10	500m
1N5876B	S			Z						43	3.0	5.0	500m
1N5877A	S			Z						47	2.7	10	500m
1N5877B	S			Z						47	2.7	5.0	500m
1N5878A	S			Z						51	2.5	10	500m
1N5878B	S			Z						51	2.5	5.0	500m
1N5879A	S			Z						56	2.2	10	500m
1N5879B	S			Z						56	2.2	5.0	500m
1N5880A	S			Z						60	2.1	10	500m
1N5880B	S			Z						60	2.1	5.0	500m
1N5881A	S			Z						62	2.0	10	500m
1N5881B	S			Z						62	2.0	5.0	500m
1N5882A	S			Z						68	1.8	10	500m
1N5882B	S			Z						68	1.8	5.0	500m
1N5883A	S			Z						75	1.7	10	500m
1N5883B	S			Z						75	1.7	5.0	500m
1N5884A	S			Z						82	1.5	10	500m
1N5884B	S			Z						82	1.5	5.0	500m
1N5885A	S			Z						87	1.4	10	500m
1N5885B	S			Z						87	1.4	5.0	500m
1N5886A	S			Z						91	1.4	10	500m
1N5886B	S			Z						91	1.4	5.0	500m
1N5887A	S			Z						100	1.3	10	500m
1N5887B	S			Z						100	1.3	5.0	500m
1N5888A	S			Z						110	1.1	10	500m
1N5888B	S			Z						110	1.1	5.0	500m
1N5889A	S			Z						120	1.0	10	500m
1N5889B	S			Z						120	1.0	5.0	500m
1N5890A	S			Z						130	0.95	10	500m
1N5890B	S			Z						130	0.95	5.0	500m
1N5891A	S			Z						140	0.90	10	500m
1N5891B	S			Z						140	0.90	5.0	500m
1N5892A	S			Z						150	0.85	10	500m
1N5892B	S			Z						150	0.85	5.0	500m
1N5893A	S			Z						160	0.80	10	500m
1N5893B	S			Z						160	0.80	5.0	500m
1N5894A	S			Z						170	0.74	10	500m
1N5894B	S			Z						170	0.74	5.0	500m
1N5895A	S			Z						180	0.68	10	500m
1N5895B	S			Z						180	0.68	5.0	500m
1N5896A	S			Z						190	0.66	10	500m
1N5896B	S			Z						190	0.66	5.0	500m
1N5897A	S			Z						200	0.65	10	500m
1N5897B	S			Z						200	0.65	5.0	500m
1N5906			Table 4	M									

TABLE I — FOUR-LAYER DIODES

The following table provides a numerical listing and short-form specifications for four-layer diodes with EIA-registered type numbers.

KEY

TYPE	REPLACEMENT	REFERENCE	$V_{(BR)F}$ Volts		I_H mA		V_F @ I_F Volts mA		I_F mA	P_D mW
			Min	Max	Min	Max	Max		Max	Max
Numerical listing of Registered Type Numbers ***Available from Motorola**										
Type number of recommended replacement or nearest electrical equivalent										
First type number on data sheet where the EIA type or replacement part is located.										
Forward Breakover (Switching) Voltage required to switch the device from the "blocking" state to the "on" state (in volts dc)										
Holding Current — the value of current required to hold the diode in the conducting state										
Forward Voltage — the forward voltage across the device at a specified forward current										
Forward Current — the continuous or dc value of forward current during the "on" state										
Steady state power dissipation										

4-LAYER DIODES INDEX

TYPE	REPLACEMENT	REFERENCE	$V_{(BR)F}$ Volts		I_H mA		V_F Volts	@ I_F mA	I_F mA	P_D mW
			Min	Max	Min	Max	Max		Max	Max
1N3299			36	44	1.0	15				150
1N3300			14.4	21.6	1.0	15	1.5	30	200	400
1N3300A			16.2	19.8	1.0	15	1.5	30	200	400
1N3301			17.6	26.4	1.0	15	1.5	30	200	400
1N3301A			19.8	24.2	1.0	15	1.5	30	200	400
1N3302			21.6	32.4	5.0	20	1.5	30	200	400
1N3302A			24.3	29.7	5.0	20	1.5	30	200	400
1N3303			26.4	39.6	5.0	20	1.5	30	200	400
1N3303A			29.7	36.3	5.0	20	1.5	30	200	400
1N3304			31.2	46.8	5.0	20	1.5	30	200	400
1N3304A			35.1	42.9	5.0	20	1.5	30	200	400
1N3489			16	24	1.0	6.0				150
1N3489A			16	24	1.0	6.0				150
1N3490			16	24	14	45				150
1N3771						4.0	1.2			
1N3772						50	1.2			
1N3831			16	24	0.5	15	1.2	15	150	150
1N3832			21	29	0.5	15	1.2	15	150	150
1N3833			26	34	0.5	15	1.2	15	150	150
1N3834			31	39	0.5	15	1.2	15	150	150
1N3835			36	44	0.5	15	1.2	15	150	150
1N3836			41	49	0.5	15	1.2	15	150	150
1N3837			46	54	0.5	15	1.2	15	150	150
1N3838			90	110	0.5	15	1.2	15	150	150
1N3839			16	24	14	50	1.2	50	150	150
1N3840			21	29	14	50	1.2	50	150	150
1N3841			26	34	14	50	1.2	50	150	150
1N3842			31	39	14	50	1.2	50	150	150
1N3843			36	44	14	50	1.2	50	150	150
1N3844			41	49	14	50	1.2	50	150	150
1N3845			46	54	14	50	1.2	50	150	150
1N3846			90	110	14	50	1.2	50	150	150
1N3935				30		30				
1N3936				20		8.0				
1N3937				100		3.5				
★1N5158		1N5158	8.0	10	1.0	20	1.5	150	150	150
★1N5159		1N5158	9.0	11	1.0	20	1.5	150	150	150
★1N5160		1N5158	10	12	1.0	20	1.5	150	150	150
★1N5799		1N5188	11	13	1.0	20	1.5	150	500	150
★1N5780		1N5188	12	14	1.0	20	1.5	150	500	150
★1N5781		1N5188	13	15	1.0	20	1.5	150	500	150
★1N5782		1N5188	8.0	10	10	50	1.5	150	500	150
★1N5783			9.0	11	10	50	1.5	150	500	150
1N5784			10	12	10	50	1.5	150	500	150
1N5785			11	13	10	50	1.5	150	500	150
1N5786			12	14	10	50	1.5	150	500	150
1N5787			13	15	10	50	1.5	150	500	150
1N5788			8.0	10	0.1	2.0	1.5	150	500	150
1N5789			9.0	11	0.1	2.0	1.5	150	500	150
1N5790			10	12	0.1	2.0	1.5	150	500	150
1N5791			11	13	0.1	2.0	1.5	150	500	150
1N5792			12	14	0.1	2.0	1.5	150	500	150
1N5793			13	15	0.1	2.0	1.5	150	500	150

TABLE 2 – TRANSIENT SUPPRESSORS

The following table provides a numerical index and short-form specifications for voltage-transient suppressor diodes with EIA-registered type numbers

KEY

TYPE	MATERIAL	REPLACEMENT	REFERENCE	$V_{(BR)R}$ Volts	@ I_R mAdc	V_{RM} Volts(wkg)	V_R Volts	I_R (surge) Amp	TC %/°C
				Min			Max	Max	Max
Numerical Listing of Registered Type Numbers.	S – Silicon	Type number of recommended replacement or of nearest electrical equivalent	First type number on data sheet where the EIA type or replacement part is located.	Breakdown Voltage	Reverse Current	Reverse Voltage (working) @ $T_A = 25^{\circ}C$	Peak Reverse Voltage during Reverse Surge	Maximum Surge Current	Temperature Coefficient of Breakdown Voltage

TRANSIENT SUPPRESSOR DIODES INDEX

1N5555-1N5632

TYPE	MATERIAL	REPLACEMENT	REFERENCE	$V_{(BR)R}$ Volts	@ I_R mA	V_{RM} Volts(wkg)	V_R Volts	I_R (surge) Amp	TC %/°C
				Min			Max	Max	Max
1N5555	S	1N2991B	1N2970	33	0.005	21.5	30.5		0.093
1N5556	S	1N2995B	1N2970	43.7	0.005	28.5	40.3		0.094
1N5557	S	1N2997B	1N2970	54	0.005	34.5	49		0.096
1N5558	S	1N3015B	1N2970	191	0.005	124	175		0.100
1N5610	S	1N2991B	1N2970	33	1.0		30.5	32	+0.1
1N5611	S	1N2995B	1N2970	43.7	1.0		40.3	24	+0.1
1N5612	S	1N2997B	1N2970	54	1.0		49	19	+0.1
1N5613	S	1N3015B	1N2970	191	1.0		175	5.7	+0.1
1N5629	S	1N2970A	1N2970	6.12	10	5.5	10.8	139	0.057
1N5629A	S	1N2970B	1N2970	6.45	10	5.8	10.5	143	0.057
1N5630	S	1N2971A	1N2970	6.75	10	6.05	11.7	128	0.061
1N5630A	S	1N2971B	1N2970	7.13	10	6.40	11.3	132	0.061
1N5631	S	1N2972A	1N2970	7.38	10	6.63	12.5	120	0.065
1N5631A	S	1N2972B	1N2970	7.79	10	7.02	12.1	124	0.065
1N5632	S	1N2973A	1N2970	8.19	1.0	7.37	13.8	109	0.068

TRANSIENT SUPPRESSOR DIODES INDEX

TYPE	MATERIAL	REPLACEMENT	REFERENCE	$V_{(BR)R}$ Volts	@ I_R mA	V_{RM} Volts(wkg)	V_R Volts	I_R (surge) Amp	TC %/°C
				Min			Max	Max	Max
1N5632A	S	1N2973B	1N2970	8.65	1.0	7.78	13.4	112	0.068
1N5633	S	1N2974A	1N2970	9.0	1.0	8.10	15	100	0.073
1N5633A	S	1N2974B	1N2970	9.5	1.0	8.55	1.45	103	0.073
1N5634	S	1N2975A	1N2970	9.9	1.0	8.92	16.2	93	0.075
1N5634A	S	1N2975B	1N2970	10.5	1.0	9.40	15.6	96	0.075
1N5635	S	1N2976A	1N2970	10.8	1.0	9.72	17.3	87	0.078
1N5635A	S	1N2976B	1N2970	11.4	1.0	10	16.7	90	0.078
1N5636	S	1N2977A	1N2970	11.7	1.0	10.5	19	79	0.081
1N5636A	S	1N2977B	1N2970	12.4	1.0	11.1	18.2	82	0.081
1N5637	S	1N2979A	1N2970	13.5	1.0	12.1	22	68	0.084
1N5637A	S	1N2979B	1N2970	14.3	1.0	12.8	21.2	71	0.084
1N5638	S	1N2980A	1N2970	14.4	1.0	12.9	23.5	64	0.086
1N5638A	S	1N2980B	1N2970	15.2	1.0	13.6	22.5	67	0.086
1N5639	S	1N2982A	1N2970	16.2	1.0	14.5	26.5	56.5	0.088
1N5639A	S	1N2982B	1N2970	17.1	1.0	15.3	25.2	59.5	0.088
1N5640	S	1N2984A	1N2970	18	1.0	16.2	29.1	51.5	0.090
1N5640A	S	1N2984B	1N2970	19	1.0	17.1	27.7	54	0.090
1N5641	S	1N2985A	1N2970	19.8	1.0	17.8	31.9	47	0.092
1N5641A	S	1N2985B	1N2970	20.9	1.0	18.8	30.6	49	0.092
1N5642	S	1N2986A	1N2970	21.6	1.0	19.4	34.7	43	0.094
1N5642A	S	1N2986B	1N2970	22.8	1.0	20.5	33.2	45	0.094
1N5643	S	1N2988A	1N2970	24.3	1.0	21.8	39.1	38.5	0.096
1N5643A	S	1N2988B	1N2970	25.7	1.0	23.1	37.5	40	0.096
1N5644	S	1N2989A	1N2970	27	1.0	24.3	43.5	34.5	0.097
1N5644A	S	1N2989B	1N2970	28.5	1.0	25.6	41.4	36	0.097
1N5645	S	1N2990A	1N2970	29.7	1.0	26.8	47.7	31.5	0.098
1N5645A	S	1N2990B	1N2970	31.4	1.0	28.2	45.7	33	0.098
1N5646	S	1N2991A	1N2970	32.4	1.0	29.1	52	29	0.099
1N5646A	S	1N2991B	1N2970	34.2	1.0	30.8	49.9	30	0.099
1N5647	S	1N2992A	1N2970	35.1	1.0	31.6	56.4	26.5	0.100
1N5647A	S	1N2992B	1N2970	37.1	1.0	33.3	53.9	28	0.100
1N5648	S	1N2993A	1N2970	38.7	1.0	34.8	61.9	24	0.101
1N5648A	S	1N2993B	1N2970	40.9	1.0	36.8	59.3	25.3	0.101
1N5649	S	1N2995A	1N2970	42.3	1.0	38.1	67.8	22.2	0.101
1N5649A	S	1N2995B	1N2970	44.7	1.0	40.2	64.8	23.2	0.101
1N5650	S	1N2997A	1N2970	45.9	1.0	41.3	73.5	20.4	0.102
1N5650A	S	1N2997B	1N2970	48.5	1.0	43.6	70.1	21.4	0.102
1N5651	S	1N2999A	1N2970	50.4	1.0	45.4	80.5	18.6	0.103
1N5651A	S	1N2999B	1N2970	53.2	1.0	47.8	77	19.5	0.103
1N5652	S	1N3000A	1N2970	55.8	1.0	50.2	89	16.9	0.104
1N5652A	S	1N3000B	1N2970	58.9	1.0	53	85	17.7	0.104
1N5653	S	1N3001A	1N2970	61.2	1.0	55.1	98	15.3	0.104
1N5653A	S	1N3001B	1N2970	64.6	1.0	58.1	92	16.3	0.104
1N5654	S	1N3002A	1N2970	67.5	1.0	60.7	108	13.9	0.105
1N5654A	S	1N3002B	1N2970	71.3	1.0	64.1	103	14.6	0.105
1N5655	S	1N3003A	1N2970	73.8	1.0	66.4	118	12.7	0.105
1N5655A	S	1N3003B	1N2970	77.9	1.0	70.1	113	13.3	0.105
1N5656	S	1N3004A	1N2970	81.9	1.0	73.7	131	11.4	0.106
1N5656A	S	1N3004B	1N2970	86.5	1.0	77.8	125	12	0.106
1N5657	S	1N3005A	1N2970	90	1.0	81	144	10.4	0.106
1N5657A	S	1N3005B	1N2970	95	1.0	85.5	137	11	0.106
1N5658	S	1N3007A	1N2970	99	1.0	89.2	158	9.5	0.107
1N5658A	S	1N3007B	1N2970	105	1.0	94	152	9.9	0.107
1N5659	S	1N3008A	1N2970	108	1.0	97.2	173	8.7	0.107
1N5659A	S	1N3008B	1N2970	114	1.0	102	165	9.1	0.107
1N5660	S	1N3009A	1N2970	117	1.0	105	187	8.0	0.107
1N5660A	S	1N3009B	1N2970	124	1.0	111	179	8.4	0.107
1N5661	S	1N3011A	1N2970	135	1.0	121	215	7.0	0.108
1N5661A	S	1N3011B	1N2970	143	1.0	128	207	7.2	0.108
1N5662	S	1N3012A	1N2970	144	1.0	130	230	6.5	0.108
1N5662A	S	1N3012B	1N2970	152	1.0	136	219	6.8	0.108
1N5663	S	1N3013A	1N2970	153	1.0	138	244	6.2	0.108
1N5663A	S	1N3013B	1N2970	162	1.0	145	234	6.4	0.108
1N5664	S	1N3014A	1N2970	162	1.0	146	258	5.8	0.108
1N5664A	S	1N3014B	1N2970	171	1.0	154	246	6.1	0.108
1N5665	S	1N3015A	1N2970	180	1.0	162	287	5.2	0.108
1N5665A	S	1N3015B	1N2970	190	1.0	171	274	5.5	0.108

TABLE 3 – VARACTORS

The following table provides a numerical index and short-form specifications for varactor diodes with EIA-registered type numbers

KEY

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BVR	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol %	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	Test Voltages V_2 Volts	Volts		MHz	Watts
Numerical Listing of Registered Type Numbers *Available from Motorola	Type number of recommended replacement or of nearest electrical equivalent	First type number on data sheet where the EIA type or replacement part is located.	Nominal Total Capacitance	Tolerance of capacitance listed in preceding column	Capacitance Ratio (Capacitance at Voltage V_1 divided by capacitance at Voltage V_2)	Test voltages for capacitance ratio		Reverse Breakdown Voltage	Figure of Merit at specified frequency		Power Dissipation at 25°C

VARACTOR DIODES INDEX

1N950-1N3555

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol %	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	Test Voltages V_2 Volts	Volts		MHz	Watts
1N950			35		2.51	4.0	130	130	7.0	0.05	
1N951			50		2.4	4.0	80	80	7.0	0.05	
1N952			70		2.43	4.0	60	60	7.0	0.05	
1N953			100		2.4	4.0	25	25	7.0	0.05	
1N954			35		2.51	4.0	25	25	7.0	0.05	
1N955			50		2.4	4.0	25	25	7.0	0.05	
1N956			70		2.43	4.0	25	25	7.0	0.05	
1N2627			2.75		1.75	0	5.0	5.0	10	1.0	
1N2628			2.5		1.5	0	5.0	5.0	14	1.0	
1N3182			33					20	65	0.05	0.163
1N3488			56					15	7.0	0.05	
1N3551	1N5472A	1N5461A	50	6.0	1.38	4.0	8.0	11	30	0.05	
1N3552	1N5447A	1N5441A	21.5	6.0				22	25	0.05	
1N3554	1N5141A	1N5139	12					100			
1N3555	1N5144	1N5139	20					100	60	0.05	

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV$_R$ Volts	Q @ f		P$_D$ @ 25°C Watts
			C$_T$ Nom pF	C Tol %	$\frac{C1}{C2}$ Min	Test Voltages V$_1$ Volts	Test Voltages V$_2$ Volts		Q	f MHz	
1N3556	1N5148	1N5139	47					100	50	0.10	
1N3557	1N5144	1N5139	24					210	75	0.05	
1N3627			21.3		2.45	4.0	20	20	25	0.05	
1N3628	1N5452A	1N5441A	50		2.5	4.0	20	20	30	0.05	
1N3770			2.0					5.5			
1N3945	1N5447A	1N5441A	20		1.5	4.0	20	20	7.0	0.05	0.50
1N3946			71					9.0	7.0	0.05	0.50
1N3947	1N5474A	1N5461A	70					9.0	9.0	0.05	
1N4091	1N5461A	1N5461A	4.2		2.5			6.0			0.30
1N4387	1N4387	1N4387	35					150	150	0.05	20
1N4388	1N4388	1N4388	20					100	200	0.05	10
1N4598			22		4.04	4.0	90	90	50	0.05	0.25
1N4599			47		5.0	2.0	100	110	100	0.05	0.50
1N4609			22		2.64	4.0	35	35	60	0.05	0.25
1N4786	1N5441A	1N5441A	6.8	20	2.56	0	4.0	25	15	0.05	0.50
1N4786A	1N5441A	1N5441A	6.8	10	2.56	0	4.0	25	15	0.05	0.50
1N4786B	1N5441B	1N5441A	6.8	5.0	2.56	0	4.0	25	15	0.05	0.50
1N4786C	1N5441C	1N5441A	6.8	2.0	2.56	0	4.0	25	15	0.05	0.50
1N4786D	1N5441D	1N5441A	6.8	1.0	2.56	0	4.0	25	15	0.05	0.50
1N4787	1N5442A	1N5441A	8.2	20	2.56	0	4.0	25	15	0.05	0.50
1N4787A	1N5442A	1N5441A	8.2	10	2.56	0	4.0	25	15	0.05	0.50
1N4787B	1N5442B	1N5441A	8.2	5.0	2.56	0	4.0	25	15	0.05	0.50
1N4787C	1N5442C	1N5441A	8.2	2.0	2.56	0	4.0	25	15	0.05	0.50
1N4787D	1N5442D	1N5441A	8.2	1.0	2.56	0	4.0	25	15	0.05	0.50
1N4788	1N5443A	1N5441A	10	20	2.50	0	4.0	25	15	0.05	0.50
1N4788A	1N5443A	1N5441A	10	10	2.50	0	4.0	25	15	0.05	0.50
1N4788B	1N5443B	1N5441A	10	5.0	2.50	0	4.0	25	15	0.05	0.50
1N4788C	1N5443C	1N5441A	10	2.0	2.50	0	4.0	25	15	0.05	0.50
1N4788D	1N5443D	1N5441A	10	1.0	2.50	0	4.0	25	15	0.05	0.50
1N4789	1N5444A	1N5441A	12	20	2.49	0	4.0	25	15	0.05	0.50
1N4789A	1N5444A	1N5441A	12	10	2.49	0	4.0	25	15	0.05	0.50
1N4789B	1N5444B	1N5441A	12	5.0	2.49	0	4.0	25	15	0.05	0.50
1N4789C	1N5444C	1N5441A	12	2.0	2.49	0	4.0	25	15	0.05	0.50
1N4789D	1N5444D	1N5441A	12	1.0	2.49	0	4.0	25	15	0.05	0.50
1N4790	1N5445A	1N5441A	15	20	2.49	0	4.0	25	15	0.05	0.50
1N4790A	1N5445A	1N5441A	15	10	2.49	0	4.0	25	15	0.05	0.50
1N4790B	1N5445B	1N5441A	15	5.0	2.49	0	4.0	25	15	0.05	0.50
1N4790C	1N5445C	1N5441A	15	2.0	2.49	0	4.0	25	15	0.05	0.50
1N4790D	1N5445D	1N5441A	15	1.0	2.49	0	4.0	25	15	0.05	0.50
1N4791	1N5446A	1N5441A	18	20	2.48	0	4.0	20	15	0.05	0.50
1N4791A	1N5446A	1N5441A	18	10	2.48	0	4.0	20	15	0.05	0.50
1N4791B	1N5446B	1N5441A	18	5.0	2.48	0	4.0	20	15	0.05	0.50
1N4791C	1N5446C	1N5441A	18	2.0	2.48	0	4.0	20	15	0.05	0.50
1N4791D	1N5446D	1N5441A	18	1.0	2.48	0	4.0	20	15	0.05	0.50
1N4792	1N5448A	1N5441A	22	20	2.46	0	4.0	20	15	0.05	0.50
1N4792A	1N5448A	1N5441A	22	10	2.46	0	4.0	20	15	0.05	0.50
1N4792B	1N5448B	1N5441A	22	5.0	2.46	0	4.0	20	15	0.05	0.50
1N4792C	1N5448C	1N5441A	22	2.0	2.46	0	4.0	20	15	0.05	0.50
1N4792D	1N5448D	1N5441A	22	1.0	2.46	0	4.0	20	15	0.05	0.50
1N4793	1N5449A	1N5441A	27	20	2.46	0	4.0	20	15	0.05	0.50
1N4793A	1N5449A	1N5441A	27	10	2.46	0	4.0	20	15	0.05	0.50
1N4793B	1N5449B	1N5441A	27	5.0	2.46	0	4.0	20	15	0.05	0.50
1N4793C	1N5449C	1N5441A	27	2.0	2.46	0	4.0	20	15	0.05	0.50
1N4793D	1N5449D	1N5441A	27	1.0	2.46	0	4.0	20	15	0.05	0.50
1N4794	1N5450A	1N5441A	33	20	2.46	0	4.0	20	15	0.05	0.50
1N4794A	1N5450A	1N5441A	33	10	2.46	0	4.0	20	15	0.05	0.50
1N4794B	1N5450B	1N5441A	33	5.0	2.46	0	4.0	20	15	0.05	0.50
1N4794C	1N5450C	1N5441A	33	2.0	2.46	0	4.0	20	15	0.05	0.50
1N4794D	1N5450D	1N5441A	33	1.0	2.46	0	4.0	20	15	0.05	0.50
1N4795	1N5451A	1N5441A	39	20	2.44	0	4.0	20	15	0.05	0.50
1N4795A	1N5451A	1N5441A	39	10	2.44	0	4.0	20	15	0.05	0.50
1N4795B	1N5451B	1N5441A	39	5.0	2.44	0	4.0	20	15	0.05	0.50
1N4795C	1N5451C	1N5441A	39	2.0	2.44	0	4.0	20	15	0.05	0.50
1N4795D	1N5451D	1N5441A	39	1.0	2.44	0	4.0	20	15	0.05	0.50
1N4796	1N5452A	1N5441A	47	20	2.43	0	4.0	20	15	0.05	0.50
1N4796A	1N5452A	1N5441A	47	10	2.43	0	4.0	20	15	0.05	0.50
1N4796B	1N5452B	1N5441A	47	5.0	2.43	0	4.0	20	15	0.05	0.50
1N4796C	1N5452C	1N5441A	47	2.0	2.43	0	4.0	20	15	0.05	0.50
1N4796D	1N5452D	1N5441A	47	1.0	2.43	0	4.0	20	15	0.05	0.50
1N4797	1N5453A	1N5441A	56	20	2.42	0	4.0	15	15	0.05	0.50

VARACTOR DIODES INDEX

1N4797A-1N4811

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol %	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	V_2 Volts	Volts		GHz	Watts
1N4797A	1N5453A	1N5441A	56	10	2.42	0	4.0	15	15	0.05	0.50
1N4797B	1N5453B	1N5441A	56	5.0	2.42	0	4.0	15	15	0.05	0.50
1N4797C	1N5453C	1N5441A	56	2.0	2.42	0	4.0	15	15	0.05	0.50
1N4797D	1N5453D	1N5441A	56	1.0	2.42	0	4.0	15	15	0.05	0.50
1N4798	1N5454A	1N5441A	68	20	2.40	0	4.0	15	15	0.05	0.50
1N4798A	1N5454A	1N5441A	68	10	2.40	0	4.0	15	15	0.05	0.50
1N4798B	1N5454B	1N5441A	68	5.0	2.40	0	4.0	15	15	0.05	0.50
1N4798C	1N5454C	1N5441A	68	2.0	2.40	0	4.0	15	15	0.05	0.50
1N4798D	1N5454D	1N5441A	68	1.0	2.40	0	4.0	15	15	0.05	0.50
1N4799	1N5455A	1N5441A	82	20	2.36	0	4.0	15	15	0.05	0.50
1N4799A	1N5455A	1N5441A	82	10	2.36	0	4.0	15	15	0.05	0.50
1N4799B	1N5455B	1N5441A	82	5.0	2.36	0	4.0	15	15	0.05	0.50
1N4799C	1N5455C	1N5441A	82	2.0	2.36	0	4.0	15	15	0.05	0.50
1N4799D	1N5455D	1N5441A	82	1.0	2.36	0	4.0	15	15	0.05	0.50
1N4800	1N5456A	1N5441A	100	20	2.33	0	4.0	15	15	0.05	0.50
1N4800A	1N5456A	1N5441A	100	10	2.33	0	4.0	15	15	0.05	0.50
1N4800B	1N5456B	1N5441A	100	5.0	2.33	0	4.0	15	15	0.05	0.50
1N4800C	1N5456C	1N5441A	100	2.0	2.33	0	4.0	15	15	0.05	0.50
1N4800D	1N5456D	1N5441A	100	1.0	2.33	0	4.0	15	15	0.05	0.50
1N4801	1N5139	1N5139	6.8	20	2.56	0	4.0	100	15	0.05	0.50
1N4801A	1N5139A	1N5139	6.8	10	2.56	0	4.0	100	15	0.05	0.50
1N4801B	1N5139B	1N5139	6.8	5.0	2.56	0	4.0	100	15	0.05	0.50
1N4801C	1N5139C	1N5139	6.8	2.0	2.56	0	4.0	100	15	0.05	0.50
1N4801D	1N5139D	1N5139	6.8	1.0	2.56	0	4.0	100	15	0.05	0.50
1N4802	1N5462A	1N5461A	8.2	20	2.58	0	4.0	100	15	0.05	0.50
1N4802A	1N5462A	1N5461A	8.2	10	2.58	0	4.0	100	15	0.05	0.50
1N4802B	1N5462B	1N5461A	8.2	5.0	2.58	0	4.0	100	15	0.05	0.50
1N4802C	1N5462C	1N5461A	8.2	2.0	2.58	0	4.0	100	15	0.05	0.50
1N4802D			8.2	1.0	2.58	0	4.0	100	15	0.05	0.50
1N4803	1N5140	1N5139	10	20	2.50	0	4.0	100	15	0.05	0.50
1N4803A	1N5140A	1N5139	10	10	2.50	0	4.0	100	15	0.05	0.50
1N4803B	1N5140B	1N5139	10	5.0	2.50	0	4.0	100	15	0.05	0.50
1N4803C	1N5140C	1N5139	10	2.0	2.50	0	4.0	100	15	0.05	0.50
1N4803D	1N5140D	1N5139	10	1.0	2.50	0	4.0	100	15	0.05	0.50
1N4804	1N5141	1N5139	12	20	2.49	0	4.0	100	15	0.05	0.50
1N4804A	1N5141A	1N5139	12	10	2.49	0	4.0	100	15	0.05	0.50
1N4804B	1N5141B	1N5139	12	5.0	2.49	0	4.0	100	15	0.05	0.50
1N4804C	1N5141C	1N5139	12	2.0	2.49	0	4.0	100	15	0.05	0.50
1N4804D	1N5141D	1N5139	12	1.0	2.49	0	4.0	100	15	0.05	0.50
1N4805	1N5142	1N5139	15	20	2.49	0	4.0	100	15	0.05	0.50
1N4805A	1N5142A	1N5139	15	10	2.49	0	4.0	100	15	0.05	0.50
1N4805B	1N5142B	1N5139	15	5.0	2.49	0	4.0	100	15	0.05	0.50
1N4805C	1N5142C	1N5139	15	2.0	2.49	0	4.0	100	15	0.05	0.50
1N4805D	1N5142D	1N5139	15	1.0	2.49	0	4.0	100	15	0.05	0.50
1N4806	1N5143	1N5139	18	20	2.48	0	4.0	90	15	0.05	
1N4806A	1N5143A	1N5139	18	10	2.48	0	4.0	90	15	0.05	
1N4806B	1N5143B	1N5139	18	5.0	2.48	0	4.0	90	15	0.05	
1N4806C	1N5143C	1N5139	18	2.0	2.48	0	4.0	90	15	0.05	
1N4806D	1N5143D	1N5139	18	1.0	2.48	0	4.0	90	15	0.05	
1N4807	1N5144	1N5139	22	20	2.46	0	4.0	90	15	0.05	0.50
1N4807A	1N5144A	1N5139	22	10	2.46	0	4.0	90	15	0.05	0.50
1N4807B	1N5144B	1N5139	22	5.0	2.46	0	4.0	90	15	0.05	0.50
1N4807C	1N5144C	1N5139	22	2.0	2.46	0	4.0	90	15	0.05	0.50
1N4807D	1N5144D	1N5139	22	1.0	2.46	0	4.0	90	15	0.05	0.50
1N4808	1N5145	1N5139	27	20	2.46	0	4.0	65	15	0.05	0.50
1N4808A	1N5145A	1N5139	27	10	2.46	0	4.0	65	15	0.05	0.50
1N4808B	1N5145B		27	5.0	2.46	0	4.0	65	15	0.05	0.50
1N4808C	1N5145C		27	2.0	2.46	0	4.0	65	15	0.05	0.50
1N4808D	1N5145D		27	1.0	2.46	0	4.0	65	15	0.05	0.50
1N4809	1N5146	1N5139	33	20	2.46	0	4.0	60	15	0.05	0.50
1N4809A	1N5146A	1N5139	33	10	2.46	0	4.0	60	15	0.05	0.50
1N4809B	1N5146B		33	5.0	2.46	0	4.0	60	15	0.05	0.50
1N4809C	1N5146C		33	2.0	2.46	0	4.0	60	15	0.05	0.50
1N4809D	1N5146D		33	1.0	2.46	0	4.0	60	15	0.05	0.50
1N4810	1N5147	1N5139	39	20	2.44	0	4.0	55	15	0.05	0.50
1N4810A	1N5147A	1N5139	39	10	2.44	0	4.0	55	15	0.05	0.50
1N4810B	1N5147B		39	5.0	2.44	0	4.0	55	15	0.05	0.50
1N4810C	1N5147C		39	2.0	2.44	0	4.0	55	15	0.05	0.50
1N4810D	1N5147D		39	1.0	2.44	0	4.0	55	15	0.05	0.50
1N4811	1N5148	1N5139	47	20	2.43	0	4.0	50	15	0.05	0.50

VARACTOR DIODES INDEX

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol %	C1/C2 Min	Test Voltages V_1 Volts	V_2 Volts	Volts		GHz	Watts
1N4811A	1N5148A	1N5139	47	10	2.43	0	4.0	50	15	0.05	0.50
1N4811B	1N5148B		47	5.0	2.43	0	4.0	50	15	0.05	0.50
1N4811C	1N5148C		47	2.0	2.43	0	4.0	50	15	0.05	0.50
1N4811D	1N5148D		47	1.0	2.43	0	4.0	50	15	0.05	0.50
1N4812	1N5148	1N5139	56	20	2.42	0	4.0	40	15	0.05	0.50
1N4812A	1N5148A	1N5139	56	10	2.42	0	4.0	40	15	0.05	0.50
1N4812B	1N5148B		56	5.0	2.42	0	4.0	40	15	0.05	0.50
1N4812C	1N5148C		56	2.0	2.42	0	4.0	40	15	0.05	0.50
1N4812D	1N5148D		56	1.0	2.42	0	4.0	40	15	0.05	0.50
1N4813	1N5454A	1N5441A	68	20	2.40	0	4.0	30	15	0.05	0.50
1N4813A	1N5454A	1N5441A	68	10	2.40	0	4.0	30	15	0.05	0.50
1N4813B	1N5454B	1N5441A	68	5.0	2.40	0	4.0	30	15	0.05	0.50
1N4813C	1N5454C	1N5441A	68	2.0	2.40	0	4.0	30	15	0.05	0.50
1N4813D	1N5454D		68	1.0	2.40	0	4.0	30	15	0.05	0.50
1N4814			82	20	2.36	0	4.0	20	15	0.05	0.50
1N4814A			82	10	2.36	0	4.0	20	15	0.05	0.50
1N4814B			82	5.0	2.36	0	4.0	20	15	0.05	0.50
1N4814C			82	2.0	2.36	0	4.0	20	15	0.05	0.50
1N4814D			82	1.0	2.36	0	4.0	20	15	0.05	0.50
1N4815			100	20	2.33	0	4.0	20	15	0.05	0.50
1N4815A			100	10	2.33	0	4.0	20	15	0.05	0.50
1N4815B			100	5.0	2.33	0	4.0	20	15	0.05	0.50
1N4815C			100	2.0	2.33	0	4.0	20	15	0.05	0.50
1N4815D			100	1.0	2.33	0	4.0	20	15	0.05	0.50
1N4885			35		2.57	6.0	150	150			20
1N4886			35		2.57	6.0	120	120			20
1N4941			0.4		2.0	0	6.0	6.0	2000	10	0.1
1N5136			1.0	20	2.2	4.0	60	60	350	0.05	0.4
1N5136A			1.0	10	2.2	4.0	60	60	350	0.05	0.4
1N5137			2.2	20	2.2	4.0	60	60	350	0.05	0.4
1N5137A			2.2	10	2.2	4.0	60	60	350	0.05	0.4
1N5138			3.3	20	2.4	4.0	60	60	350	0.05	0.4
1N5138A			3.3	10	2.4	4.0	60	60	350	0.05	0.4
★1N5139		1N5139	6.8	10	2.9	4.0	60	60	350	0.05	0.4
★1N5139A		1N5139A	6.8	5.0	2.9	4.0	60	60	350	0.05	0.4
★1N5140		1N5140	10	10	3.0	4.0	60	60	300	0.05	0.4
★1N5140A		1N5140A	10	5.0	3.0	4.0	60	60	300	0.05	0.4
★1N5141		1N5141	12	10	3.0	4.0	60	60	300	0.05	0.4
★1N5141A		1N5141A	12	5.0	3.0	4.0	60	60	300	0.05	0.4
★1N5142		1N5142	15	10	3.0	4.0	60	60	250	0.05	0.4
★1N5142A		1N5142A	15	5.0	3.0	4.0	60	60	250	0.05	0.4
★1N5143		1N5143	18	10	3.0	4.0	60	60	250	0.05	0.4
★1N5143A		1N5143A	18	5.0	3.0	4.0	60	60	250	0.05	0.4
★1N5144		1N5144	22	10	3.4	4.0	60	60	200	0.05	0.4
★1N5144A		1N5144A	22	5.0	3.4	4.0	60	60	200	0.05	0.4
★1N5145		1N5145	27	10	3.4	4.0	60	60	200	0.05	0.4
★1N5145A		1N5145A	27	5.0	3.4	4.0	60	60	200	0.05	0.4
★1N5146		1N5146	33	10	3.4	4.0	60	60	200	0.05	0.4
★1N5146A		1N5146A	33	5.0	3.4	4.0	60	60	200	0.05	0.4
★1N5147		1N5147	39	10	3.4	4.0	60	60	200	0.05	0.4
★1N5147A		1N5147A	39	5.0	3.4	4.0	60	60	200	0.05	0.4
★1N5148		1N5148	47	10	3.4	4.0	60	60	200	0.05	0.4
★1N5148A		1N5148A	47	5.0	3.4	4.0	60	60	200	0.05	0.4
★1N5149		1N5149	11.5					80	800	0.05	10
★1N5150		1N5149	11.5					80	800	0.05	14
★1N5150A		1N5150A	12	10				80	800	0.05	29.2
★1N5151		1N5151	5.8					75	1100	0.05	5.5
★1N5152		1N5151	5.8					75	1100	0.05	5.5
★1N5152A		1N5150A	6.0	10				75	1100	0.05	11.7
★1N5153		1N5151	5.8					75	1100	0.05	5.5
★1N5153A		1N5150A	6.4	10				75	1100	0.05	11.7
★1N5154		1N5154	2.1					35	1700	0.05	3.5
★1N5155		1N5154	2.1					35	1700	0.05	3.5
★1N5155A		1N5150A	1.9	10				35	1700	0.05	8.75
★1N5156		1N5156	0.8	25				20	3600	0.05	3.25
★1N5157		1N5156	0.8	25				20	3600	0.05	3.25
1N5421			210	20	4.1	4.0	100	210	200	0.025	0.25
1N5422			340	20	4.1	4.0	100	210	200	0.025	0.25
1N5423			680	20	4.1	4.0	100	210	150	0.025	0.25
1N5424			680	20	4.2	4.0	100	115	300	0.010	0.25

VARACTOR DIODES INDEX

1N5425-1N5452C

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom	C Tol	C1/C2	Test Voltages					
						V1	V2				
			pF	%	Min	Volts	Volts	Volts		GHz	Watts
1N5425			1370	20	4.2	4.0	100	115	200	0.010	0.25
1N5439			3.3	20	2.3	2.0	30	30	450	0.05	0.4
1N5439A			3.3	10	2.3	2.0	30	30	450	0.05	0.4
1N5439B			3.3	5.0	2.3	2.0	30	30	450	0.05	0.4
1N5439C			3.3	2.0	2.3	2.0	30	30	450	0.05	0.4
1N5439D			3.3	1.0	2.3	2.0	30	30	450	0.05	0.4
1N5440			4.7	20	2.4	2.0	30	30	450	0.05	0.4
1N5440A			4.7	10	2.4	2.0	30	30	450	0.05	0.4
1N5440B			4.7	5.0	2.4	2.0	30	30	450	0.05	0.4
1N5440C			4.7	2.0	2.4	2.0	30	30	450	0.05	0.4
1N5440D			4.7	1.0	2.4	2.0	30	30	450	0.05	0.4
★1N5441		1N5441A	6.8	20	2.5	2.0	30	30	450	0.05	0.4
★1N5441A		1N5441A	6.8	10	2.5	2.0	30	30	450	0.05	0.4
★1N5441B		1N5441A	6.8	5.0	2.5	2.0	30	30	450	0.05	0.4
★1N5441C		1N5441A	6.8	2.0	2.5	2.0	30	30	450	0.05	0.4
★1N5441D		1N5441A	6.8	1.0	2.5	2.0	30	30	450	0.05	0.4
1N5442			8.2	20	2.5	2.0	30	30	450	0.05	0.4
★1N5442A		1N5441A	8.2	10	2.5	2.0	30	30	450	0.05	0.4
★1N5442B		1N5441A	8.2	5.0	2.5	2.0	30	30	450	0.05	0.4
★1N5442C		1N5441A	8.2	2.0	2.5	2.0	30	30	450	0.05	0.4
★1N5442D		1N5441A	8.2	1.0	2.5	2.0	30	30	450	0.05	0.4
1N5443			10	20	2.6	2.0	30	30	400	0.05	0.4
★1N5443A		1N5441A	10	10	2.6	2.0	30	30	400	0.05	0.4
★1N5443B		1N5441A	10	5.0	2.6	2.0	30	30	400	0.05	0.4
★1N5443C		1N5441A	10	2.0	2.6	2.0	30	30	400	0.05	0.4
★1N5443D		1N5441A	10	1.0	2.6	2.0	30	30	400	0.05	0.4
1N5444			12	20	2.6	2.0	30	30	400	0.05	0.4
★1N5444A		1N5441A	12	10	2.6	2.0	30	30	400	0.05	0.4
★1N5444B		1N5441A	12	5.0	2.6	2.0	30	30	400	0.05	0.4
★1N5444C		1N5441A	12	2.0	2.6	2.0	30	30	400	0.05	0.4
★1N5444D		1N5441A	12	1.0	2.6	2.0	30	30	400	0.05	0.4
1N5445			15	20	2.6	2.0	30	30	400	0.05	0.4
★1N5445A		1N5441A	15	10	2.6	2.0	30	30	400	0.05	0.4
★1N5445B		1N5441A	15	5.0	2.6	2.0	30	30	400	0.05	0.4
★1N5445C		1N5441A	15	2.0	2.6	2.0	30	30	400	0.05	0.4
★1N5445D		1N5441A	15	1.0	2.6	2.0	30	30	400	0.05	0.4
1N5446			18	20	2.6	2.0	30	30	350	0.05	0.4
★1N5446A		1N5441A	18	10	2.6	2.0	30	30	350	0.05	0.4
★1N5446B		1N5441A	18	5.0	2.6	2.0	30	30	350	0.05	0.4
★1N5446C		1N5441A	18	2.0	2.6	2.0	30	30	350	0.05	0.4
★1N5446D		1N5441A	18	1.0	2.6	2.0	30	30	350	0.05	0.4
1N5447			20	20	2.6	2.0	30	30	350	0.05	0.4
★1N5447A		1N5441A	20	10	2.6	2.0	30	30	350	0.05	0.4
★1N5447B		1N5441A	20	5.0	2.6	2.0	30	30	350	0.05	0.4
★1N5447C		1N5441A	20	2.0	2.6	2.0	30	30	350	0.05	0.4
★1N5447D		1N5441A	20	1.0	2.6	2.0	30	30	350	0.05	0.4
1N5448			22	20	2.6	2.0	30	30	350	0.05	0.4
★1N5448A		1N5441A	22	10	2.6	2.0	30	30	350	0.05	0.4
★1N5448B		1N5441A	22	5.0	2.6	2.0	30	30	350	0.05	0.4
★1N5448C		1N5441A	22	2.0	2.6	2.0	30	30	350	0.05	0.4
★1N5448D		1N5441A	22	1.0	2.6	2.0	30	30	350	0.05	0.4
1N5449			27	20	2.6	2.0	30	30	350	0.05	0.4
★1N5449A		1N5441A	27	10	2.6	2.0	30	30	350	0.05	0.4
★1N5449B		1N5441A	27	5.0	2.6	2.0	30	30	350	0.05	0.4
★1N5449C		1N5441A	27	2.0	2.6	2.0	30	30	350	0.05	0.4
★1N5449D		1N5441A	27	1.0	2.6	2.0	30	30	350	0.05	0.4
1N5450			33	20	2.6	2.0	30	30	350	0.05	0.4
★1N5450A		1N5441A	33	10	2.6	2.0	30	30	350	0.05	0.4
★1N5450B		1N5441A	33	5.0	2.6	2.0	30	30	350	0.05	0.4
★1N5450C		1N5441A	33	2.0	2.6	2.0	30	30	350	0.05	0.4
★1N5450D		1N5441A	33	1.0	2.6	2.0	30	30	350	0.05	0.4
★1N5451			39	20	2.6	2.0	30	30	300	0.05	0.4
★1N5451A		1N5441A	39	10	2.6	2.0	30	30	300	0.05	0.4
★1N5451B		1N5441A	39	5.0	2.6	2.0	30	30	300	0.05	0.4
★1N5451C		1N5441A	39	2.0	2.6	2.0	30	30	300	0.05	0.4
★1N5451D		1N5441A	39	1.0	2.6	2.0	30	30	300	0.05	0.4
1N5452			47	20	2.6	2.0	30	30	250	0.05	0.4
★1N5452A		1N5441A	47	10	2.6	2.0	30	30	250	0.05	0.4
★1N5452B		1N5441A	47	5.0	2.6	2.0	30	30	250	0.05	0.4
★1N5452C		1N5441A	47	2.0	2.6	2.0	30	30	250	0.05	0.4

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol %	C1/C2 Min	Test Voltages V_1 Volts	V_2 Volts	Volts	Q	GHz	Watts
★1N5452D		1N5441A	47	1.0	2.6	2.0	30	30	250	0.05	0.4
1N5453			56	20	2.6	2.0	30	30	200	0.05	0.4
★1N5453A		1N5441A	56	10	2.6	2.0	30	30	200	0.05	0.4
★1N5453B		1N5441A	56	5.0	2.6	2.0	30	30	200	0.05	0.4
★1N5453C		1N5441A	56	2.0	2.6	2.0	30	30	200	0.05	0.4
★1N5453D		1N5441A	56	1.0	2.6	2.0	30	30	200	0.05	0.4
1N5454			68	20	2.7	2.0	30	30	175	0.05	0.4
★1N5454A		1N5441A	68	10	2.7	2.0	30	30	175	0.05	0.4
★1N5454B		1N5441A	68	5.0	2.7	2.0	30	30	175	0.05	0.4
★1N5454C		1N5441A	68	2.0	2.7	2.0	30	30	175	0.05	0.4
★1N5454D		1N5441A	68	1.0	2.7	2.0	30	30	175	0.05	0.4
1N5455			82	20	2.7	2.0	30	30	175	0.05	0.4
★1N5455A		1N5441A	82	10	2.7	2.0	30	30	175	0.05	0.4
★1N5455B		1N5441A	82	5.0	2.7	2.0	30	30	175	0.05	0.4
★1N5455C		1N5441A	82	2.0	2.7	2.0	30	30	175	0.05	0.4
★1N5455D		1N5441A	82	1.0	2.7	2.0	30	30	175	0.05	0.4
1N5456			100	20	2.7	2.0	30	30	175	0.05	0.4
★1N5456A		1N5441A	100	10	2.7	2.0	30	30	175	0.05	0.4
★1N5456B		1N5441A	100	5.0	2.7	2.0	30	30	175	0.05	0.4
★1N5456C		1N5441A	100	2.0	2.7	2.0	30	30	175	0.05	0.4
★1N5456D		1N5441A	100	1.0	2.7	2.0	30	30	175	0.05	0.4
1N5457			120	20	2.7	2.0	30	30	150	0.05	0.4
★1N5457A			120	10	2.7	2.0	30	30	150	0.05	0.4
★1N5457B			120	5.0	2.7	2.0	30	30	150	0.05	0.4
1N5457C			120	2.0	2.7	2.0	30	30	150	0.05	0.4
1N5457D			120	1.0	2.7	2.0	30	30	150	0.05	0.4
1N5458			3.9	20	2.5	2.0	30	30	600	0.05	0.4
1N5458A			3.9	10	2.5	2.0	30	30	600	0.05	0.4
1N5458B			3.9	5.0	2.5	2.0	30	30	600	0.05	0.4
1N5458C			3.9	2.0	2.5	2.0	30	30	600	0.05	0.4
1N5458D			3.9	1.0	2.5	2.0	30	30	600	0.05	0.4
1N5459			4.7	20	2.6	2.0	30	30	600	0.05	0.4
1N5459A			4.7	10	2.6	2.0	30	30	600	0.05	0.4
1N5459B			4.7	5.0	2.6	2.0	30	30	600	0.05	0.4
1N5459C			4.7	2.0	2.6	2.0	30	30	600	0.05	0.4
1N5459D			4.7	1.0	2.6	2.0	30	30	600	0.05	0.4
1N5460			5.6	20	2.6	2.0	30	30	600	0.05	0.4
1N5460A			5.6	10	2.6	2.0	30	30	600	0.05	0.4
1N5460B			5.6	5.0	2.6	2.0	30	30	600	0.05	0.4
1N5460C			5.6	2.0	2.6	2.0	30	30	600	0.05	0.4
1N5460D			5.6	1.0	2.6	2.0	30	30	600	0.05	0.4
1N5461			6.8	20	2.7	2.0	30	30	600	0.05	0.4
★1N5461A		1N5461A	6.8	10	2.7	2.0	30	30	600	0.05	0.4
★1N5461B		1N5461A	6.8	5.0	2.7	2.0	30	30	600	0.05	0.4
★1N5461C		1N5461A	6.8	2.0	2.7	2.0	30	30	600	0.05	0.4
★1N5461D		1N5461A	6.8	1.0	2.7	2.0	30	30	600	0.05	0.4
1N5462			8.2	20	2.8	2.0	30	30	600	0.05	0.4
★1N5462A		1N5461A	8.2	10	2.8	2.0	30	30	600	0.05	0.4
★1N5462B		1N5461A	8.2	5.0	2.8	2.0	30	30	600	0.05	0.4
★1N5462C		1N5461A	8.2	2.0	2.8	2.0	30	30	600	0.05	0.4
★1N5462D		1N5461A	8.2	1.0	2.8	2.0	30	30	600	0.05	0.4
1N5463			10	20	2.8	2.0	30	30	550	0.05	0.4
★1N5463A		1N5461A	10	10	2.8	2.0	30	30	550	0.05	0.4
★1N5463B		1N5461A	10	5.0	2.8	2.0	30	30	550	0.05	0.4
★1N5463C		1N5461A	10	2.0	2.8	2.0	30	30	550	0.05	0.4
★1N5463D		1N5461A	10	1.0	2.8	2.0	30	30	550	0.05	0.4
1N5464			12	20	2.8	2.0	30	30	550	0.05	0.4
★1N5464A		1N5461A	12	10	2.8	2.0	30	30	550	0.05	0.4
★1N5464B		1N5461A	12	5.0	2.8	2.0	30	30	550	0.05	0.4
★1N5464C		1N5461A	12	2.0	2.8	2.0	30	30	550	0.05	0.4
★1N5464D		1N5461A	12	1.0	2.8	2.0	30	30	550	0.05	0.4
1N5465			15	20	2.8	2.0	30	30	550	0.05	0.4
★1N5465A		1N5461A	15	10	2.8	2.0	30	30	550	0.05	0.4
★1N5465B		1N5461A	15	5.0	2.8	2.0	30	30	550	0.05	0.4
★1N5465C		1N5461A	15	2.0	2.8	2.0	30	30	550	0.05	0.4
★1N5465D		1N5461A	15	1.0	2.8	2.0	30	30	550	0.05	0.4
1N5466			18	20	2.9	2.0	30	30	500	0.05	0.4
★1N5466A		1N5461A	18	10	2.9	2.0	30	30	500	0.05	0.4
★1N5466B		1N5461A	18	5.0	2.9	2.0	30	30	500	0.05	0.4
★1N5466C		1N5461A	18	2.0	2.9	2.0	30	30	500	0.05	0.4

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R Volts	Q @ f		P_D @ 25°C Watts
			C_T Nom pF	C Tol %	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	Test Voltages V_2 Volts		Q	GHz	
★1N5466D		1N5461A	18	1.0	2.9	2.0	30	30	500	0.05	0.4
1N5467			20	20	2.9	2.0	30	30	500	0.05	0.4
★1N5467A		1N5461A	20	10	2.9	2.0	30	30	500	0.05	0.4
★1N5467B		1N5461A	20	5.0	2.9	2.0	30	30	500	0.05	0.4
★1N5467C		1N5461A	20	2.0	2.9	2.0	30	30	500	0.05	0.4
★1N5467D		1N5461A	20	1.0	2.9	2.0	30	30	500	0.05	0.4
1N5468			22	20	2.9	2.0	30	30	500	0.05	0.4
★1N5468A		1N5461A	22	10	2.9	2.0	30	30	500	0.05	0.4
★1N5468B		1N5461A	22	5.0	2.9	2.0	30	30	500	0.05	0.4
★1N5468C		1N5461A	22	2.0	2.9	2.0	30	30	500	0.05	0.4
★1N5468D		1N5461A	22	1.0	2.9	2.0	30	30	500	0.05	0.4
1N5469			27	20	2.9	2.0	30	30	500	0.05	0.4
★1N5469A		1N5461A	27	10	2.9	2.0	30	30	500	0.05	0.4
★1N5469B		1N5461A	27	5.0	2.9	2.0	30	30	500	0.05	0.4
★1N5469C		1N5461A	27	2.0	2.9	2.0	30	30	500	0.05	0.4
★1N5469D		1N5461A	27	1.0	2.9	2.0	30	30	500	0.05	0.4
1N5470			33	20	2.9	2.0	30	30	500	0.05	0.4
★1N5470A		1N5461A	33	10	2.9	2.0	30	30	500	0.05	0.4
★1N5470B		1N5461A	33	5.0	2.9	2.0	30	30	500	0.05	0.4
★1N5470C		1N5461A	33	2.0	2.9	2.0	30	30	500	0.05	0.4
★1N5470D		1N5461A	33	1.0	2.9	2.0	30	30	500	0.05	0.4
1N5471			39	20	2.9	2.0	30	30	450	0.05	0.4
★1N5471A		1N5461A	39	10	2.9	2.0	30	30	450	0.05	0.4
★1N5471B		1N5461A	39	5.0	2.9	2.0	30	30	450	0.05	0.4
★1N5471C		1N5461A	39	2.0	2.9	2.0	30	30	450	0.05	0.4
★1N5471D		1N5461A	39	1.0	2.9	2.0	30	30	450	0.05	0.4
1N5472			47	20	2.9	2.0	30	30	400	0.05	0.4
★1N5472A		1N5461A	47	10	2.9	2.0	30	30	400	0.05	0.4
★1N5472B		1N5461A	47	5.0	2.9	2.0	30	30	400	0.05	0.4
★1N5472C		1N5461A	47	2.0	2.9	2.0	30	30	400	0.05	0.4
★1N5472D		1N5461A	47	1.0	2.9	2.0	30	30	400	0.05	0.4
1N5473			56	20	2.9	2.0	30	30	300	0.05	0.4
★1N5473A		1N5461A	56	10	2.9	2.0	30	30	300	0.05	0.4
★1N5473B		1N5461A	56	5.0	2.9	2.0	30	30	300	0.05	0.4
★1N5473C		1N5461A	56	2.0	2.9	2.0	30	30	300	0.05	0.4
★1N5473D		1N5461A	56	1.0	2.9	2.0	30	30	300	0.05	0.4
1N5474			68	20	2.9	2.0	30	30	250	0.05	0.4
★1N5474A		1N5461A	68	10	2.9	2.0	30	30	250	0.05	0.4
★1N5474B		1N5461A	68	5.0	2.9	2.0	30	30	250	0.05	0.4
★1N5474C		1N5461A	68	2.0	2.9	2.0	30	30	250	0.05	0.4
★1N5474D		1N5461A	68	1.0	2.9	2.0	30	30	250	0.05	0.4
1N5475			82	20	2.9	2.0	30	30	225	0.05	0.4
★1N5475A		1N5461A	82	10	2.9	2.0	30	30	225	0.05	0.4
★1N5475B		1N5461A	82	5.0	2.9	2.0	30	30	225	0.05	0.4
★1N5475C		1N5461A	82	2.0	2.9	2.0	30	30	225	0.05	0.4
★1N5475D		1N5461A	82	1.0	2.9	2.0	30	30	225	0.05	0.4
1N5476			100	20	2.9	2.0	30	30	200	0.05	0.4
★1N5476A		1N5461A	100	10	2.9	2.0	30	30	200	0.05	0.4
★1N5476B		1N5461A	100	5.0	2.9	2.0	30	30	200	0.05	0.4
★1N5476C		1N5461A	100	2.0	2.9	2.0	30	30	200	0.05	0.4
★1N5476D		1N5461A	100	1.0	2.9	2.0	30	30	200	0.05	0.4
1N5681	1N5461A	1N5461A	6.8	20	3.1	4.0	40	45	600	0.05	0.4
1N5681A	1N5461A	1N5461A	6.8	10	3.1	4.0	40	45	600	0.05	0.4
1N5681B	1N5461B	1N5461A	6.8	5.0	3.1	4.0	40	45	600	0.05	0.4
1N5682	1N5462A	1N5461A	8.2	20	3.1	4.0	40	45	600	0.05	0.4
1N5682A	1N5462A	1N5461A	8.2	10	3.1	4.0	40	45	600	0.05	0.4
1N5682B	1N5462B	1N5461A	8.2	5.0	3.1	4.0	40	45	600	0.05	0.4
1N5683	1N5463A	1N5461A	10	20	3.2	4.0	40	45	550	0.05	0.4
1N5683A	1N5463A	1N5461A	10	10	3.2	4.0	40	45	550	0.05	0.4
1N5683B	1N5463B	1N5461A	10	5.0	3.2	4.0	40	45	550	0.05	0.4
1N5684	1N5464A	1N5461A	12	20	3.2	4.0	40	45	550	0.05	0.4
1N5684A	1N5464A	1N5461A	12	10	3.2	4.0	40	45	550	0.05	0.4
1N5684B	1N5464B	1N5461A	12	5.0	3.2	4.0	40	45	550	0.05	0.4
1N5685	1N5465A	1N5461A	15	20	3.2	4.0	40	45	550	0.05	0.4
1N5685A	1N5465A	1N5461A	15	10	3.2	4.0	40	45	550	0.05	0.4
1N5685B	1N5465B	1N5461A	15	5.0	3.2	4.0	40	45	550	0.05	0.4
1N5686			18	20	3.2	4.0	40	45	500	0.05	0.4
1N5686A			18	10	3.2	4.0	40	45	500	0.05	0.4
1N5686B			18	5.0	3.2	4.0	40	45	500	0.05	0.4
1N5687			22	20	3.3	4.0	40	45	500	0.05	0.4

TYPE	REPLACEMENT	REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol %	C1/C2 Min	Test Voltages V_1 Volts	Test Voltages V_2 Volts	Volts		GHz	Watts
1N5687A			22	10	3.3	4.0	40	45	500	0.05	0.4
1N5687B			22	5.0	3.3	4.0	40	45	500	0.05	0.4
1N5688	1N5469A	1N5461A	27	20	3.3	4.0	40	45	500	0.05	0.4
1N5688A	1N5469A	1N5461A	27	10	3.3	4.0	40	45	500	0.05	0.4
1N5688B	1N5469B	1N5461A	27	5.0	3.3	4.0	40	45	500	0.05	0.4
1N5689	1N5470A	1N5461A	33	20	3.3	4.0	40	45	500	0.05	0.4
1N5689A	1N5470A	1N5461A	33	10	3.3	4.0	40	45	500	0.05	0.4
1N5689B	1N5470B	1N5461A	33	5.0	3.3	4.0	40	45	500	0.05	0.4
1N5690	1N5471A	1N5461A	39	20	3.3	4.0	40	45	450	0.05	0.4
1N5690A	1N5471A	1N5461A	39	10	3.3	4.0	40	45	450	0.05	0.4
1N5690B	1N5471B	1N5461A	39	5.0	3.3	4.0	40	45	450	0.05	0.4
1N5691	1N5472A	1N5461A	47	20	3.3	4.0	40	45	400	0.05	0.4
1N5691A	1N5472A	1N5461A	47	10	3.3	4.0	40	45	400	0.05	0.4
1N5691B	1N5472B	1N5461A	47	5.0	3.3	4.0	40	45	400	0.05	0.4
1N5692	1N5473A	1N5461A	56	20	3.3	4.0	40	45	300	0.05	0.4
1N5692A	1N5473A	1N5461A	56	10	3.3	4.0	40	45	300	0.05	0.4
1N5692B	1N5473B	1N5461A	56	5.0	3.3	4.0	40	45	300	0.05	0.4
1N5693	1N5474A	1N5461A	68	20	3.3	4.0	40	45	250	0.05	0.4
1N5693A	1N5474A	1N5461A	68	10	3.3	4.0	40	45	250	0.05	0.4
1N5693B	1N5474B	1N5461A	68	5.0	3.3	4.0	40	45	250	0.05	0.4
1N5694	1N5475A	1N5461A	82	20	3.3	4.0	40	45	225	0.05	0.4
1N5694A	1N5475A	1N5461A	82	10	3.3	4.0	40	45	225	0.05	0.4
1N5694B	1N5475B	1N5461A	82	5.0	3.3	4.0	40	45	225	0.05	0.4
1N5695	1N5476A	1N5461A	100	20	3.3	4.0	40	45	200	0.05	0.4
1N5695A	1N5476A	1N5461A	100	10	3.3	4.0	40	45	200	0.05	0.4
1N5695B	1N5476B	1N5461A	100	5.0	3.3	4.0	40	45	200	0.05	0.4
1N5696	1N5461A	1N5461A	6.8	20	2.7	2.0	60	65	450	0.05	0.4
1N5696A	1N5461A	1N5461A	6.8	10	2.7	2.0	60	65	450	0.05	0.4
1N5696B	1N5461B	1N5461A	6.8	5.0	2.7	2.0	60	65	450	0.05	0.4
1N5697	1N5462A	1N5461A	8.2	20	2.7	2.0	60	65	450	0.05	0.4
1N5697A	1N5462A	1N5461A	8.2	10	2.7	2.0	60	65	450	0.05	0.4
1N5697B	1N5462B	1N5461A	8.2	5.0	2.7	2.0	60	65	450	0.05	0.4
1N5698	1N5463A	1N5461A	10	20	2.8	2.0	60	65	400	0.05	0.4
1N5698A	1N5463A	1N5461A	10	10	2.8	2.0	60	65	400	0.05	0.4
1N5698B	1N5463B	1N5461A	10	5.0	2.8	2.0	60	65	400	0.05	0.4
1N5699	1N5464A	1N5461A	12	20	2.8	2.0	60	65	400	0.05	0.4
1N5699A	1N5464A	1N5461A	12	10	2.8	2.0	60	65	400	0.05	0.4
1N5699B	1N5464B	1N5461A	12	5.0	2.8	2.0	60	65	400	0.05	0.4
1N5700	1N5465A	1N5461A	15	20	2.8	2.0	60	65	400	0.05	0.4
1N5700A	1N5465A	1N5461A	15	10	2.8	2.0	60	65	400	0.05	0.4
1N5700B	1N5465B	1N5461A	15	5.0	2.8	2.0	60	65	400	0.05	0.4
1N5701	1N5467A	1N5461A	18	20	2.8	2.0	60	65	375	0.05	0.4
1N5701A	1N5467A	1N5461A	18	10	2.8	2.0	60	65	375	0.05	0.4
1N5701B	1N5467B	1N5461A	18	5.0	2.8	2.0	60	65	375	0.05	0.4
1N5702	1N5468A	1N5461A	22	20	3.2	2.0	60	65	375	0.05	0.4
1N5702A	1N5468A	1N5461A	22	10	3.2	2.0	50	65	375	0.05	0.4
1N5702B	1N5468B	1N5461A	22	5.0	3.2	2.0	60	65	375	0.05	0.4
1N5703	1N5469A	1N5461A	27	20	3.2	2.0	60	65	350	0.05	0.4
1N5703A	1N5469A	1N5461A	27	10	3.2	2.0	60	65	350	0.05	0.4
1N5703B	1N5469B	1N5461A	27	5.0	3.2	2.0	60	65	350	0.05	0.4
1N5704	1N5470A	1N5461A	33	20	3.2	2.0	60	65	350	0.05	0.4
1N5704A	1N5470A	1N5461A	33	10	3.2	2.0	60	65	350	0.05	0.4
1N5704B	1N5470B	1N5461A	33	5.0	3.2	2.0	60	65	350	0.05	0.4
1N5705	1N5471A	1N5461A	39	20	3.2	2.0	60	65	325	0.05	0.4
1N5705A	1N5471A	1N5461A	39	10	3.2	2.0	60	65	325	0.05	0.4
1N5705B	1N5471B	1N5461A	39	5.0	3.2	2.0	60	65	325	0.05	0.4
1N5706	1N5472A	1N5461A	47	20	3.2	2.0	60	65	300	0.05	0.4
1N5706A	1N5472A	1N5461A	47	10	3.2	2.0	60	65	300	0.05	0.4
1N5706B	1N5472B	1N5461A	47	5.0	3.2	2.0	60	65	300	0.05	0.4
1N5707	1N5473A	1N5461A	56	20	3.2	2.0	60	65	225	0.05	0.4
1N5707A	1N5473A	1N5461A	56	10	3.2	2.0	60	65	225	0.05	0.4
1N5707B	1N5473B	1N5461A	56	5.0	3.2	2.0	60	65	225	0.05	0.4
1N5708	1N5474A	1N5461A	68	20	3.2	2.0	60	65	175	0.05	0.4
1N5708A	1N5474A	1N5461A	68	10	3.2	2.0	60	65	175	0.05	0.4
1N5708B	1N5474B	1N5461A	68	5.0	3.2	2.0	60	65	175	0.05	0.4
1N5709	1N5475A	1N5461A	82	20	3.2	2.0	60	65	150	0.05	0.4
1N5709A	1N5475A	1N5461A	82	10	3.2	2.0	60	65	150	0.05	0.4
1N5709B	1N5475B	1N5461A	82	5.0	3.2	2.0	60	65	150	0.05	0.4
1N5710	1N5476A	1N5461A	100	20	3.2	2.0	60	65	150	0.05	0.4
1N5710A	1N5476A	1N5461A	100	10	3.2	2.0	60	65	150	0.05	0.4
1N5710B	1N5476B	1N5461A	100	5.0	3.2	2.0	60	65	150	0.05	0.4

TABLE 4 – MICROWAVE AND UHF DIODES

The following table provides a numerical index and short-form specifications for Microwave and UHF Diodes with EIA-registered type numbers.

KEY

TYPE	MATERIAL	FUNCTION	FREQUENCY BAND	NF dB	f GHz
Numerical Listing of Registered Type Numbers					
S = Silicon G = Germanium					
Circuit Application					
Operating frequency band					
Noise Figure					
Frequency used for Noise Figure or other Specifications					

MICROWAVE AND UHF DIODES

TYPE	MATERIAL	FUNCTION	FREQUENCY BAND	NF dB	f GHz
1N23H		Mixer		6.0	9.0
1N53	S	Mixer	Ka	13.1 to 9.0	34.86
1N53A	S	Mixer	Ka	13.1 to 9.0	34.86
1N53B	S	Mixer	Ka	13.1 to 9.0	34.86
1N53C	S	Mixer	Ka	13.1 to 9.0	34.86
1N53D	S	Mixer	Ka	13.1 to 9.0	34.86
1N76	S	Detector	X		9.37
1N76A	S	Detector	X		9.37
1N78	S	Mixer	Ku	12 to 7.5	16
1N78A	S	Mixer	Ku	12 to 7.5	16
1N78B	S	Mixer	Ku	12 to 7.5	16
1N78C	S	Mixer	Ku	12 to 7.5	16
1N78D	S	Mixer	Ku	12 to 7.5	16
1N78E	S	Mixer	Ku	12 to 7.5	16
1N78F	S	Mixer	Ku	12 to 7.5	16
1N79		Meter Rectifier			3.0
1N82	S	Mixer		16 to 14	1.0
1N82A	S	Mixer		16 to 14	1.0
1N82AG	S	Mixer		16 to 14	1.0
1N82G	S	Mixer		16 to 14	1.0
1N105	S	Switch			
1N110	G	Mixer		10	1.0
1N124	G	Mixer		10 to 8.0	1.0
1N124A	G	Mixer		10 to 8.0	1.0
1N134		Detector	UHF		0.4
1N147	G	Mixer	UHF	10 to 9.0	0.9
1N147A	G	Mixer	UHF	10 to 9.0	0.9
1N149	S	Mixer	X	8.3	9.37
1N150	S	Mixer	C	9.8	6.75
1N155	S	Detector			9.0
1N155A	S	Detector			9.0
1N156	S	Mixer	X		9.37
1N160	S	Mixer	C	11.4	6.75
1N173A	S	Mixer	UHF	13	1.0
1N259	S	Mixer Pair			9.0
1N263	G	Mixer	X	7.5	9.37
1N264	S	Mixer Pair			3.0
1N269	G	Mixer	S	7.5	
1N285		Mixer	UHF	12.5	
1N286	S	Mixer	X-K	11.3	
1N286A	S	Mixer	X-K	11.3	
1N311	S	Mixer		10.5	12
1N369	S	Detector	S-X		
1N369A	S	Detector	L-X		
1N415B	S	Mixer	X	11.4 to 6.5	
1N415C	S	Mixer	X	11.4 to 6.5	
1N415D	S	Mixer	X	11.4 to 6.5	
1N415E	S	Mixer	X	11.4 to 6.5	
1N415F	S	Mixer	X	11.4 to 6.5	
1N415G	S	Mixer	X	11.4 to 6.5	
1N415H	S	Mixer		6.0	9.0
1N416B	S	Mixer	S	10.3 to 5.5	
1N416C	S	Mixer	S	10.3 to 5.5	
1N416D	S	Mixer	S	10.3 to 5.5	
1N416E	S	Mixer	S	10.3 to 5.5	
1N416F	S	Mixer	S	10.3 to 5.5	
1N416G	S	Mixer	S	10.3 to 5.5	
1N446	S	Detector	K-Ka		
1N630	S	Detector	L-X		
1N831	S	Mixer	S	8.3 to 6.5	
1N831A	S	Mixer	S	8.3 to 6.5	
1N831B	S	Mixer	S	8.3 to 6.5	
1N832	S	Mixer	X	9.5 to 7.0	
1N832A	S	Mixer	X	9.5 to 7.0	
1N832B	S	Mixer	X	9.5 to 7.0	
1N832D		Mixer		6.0	10
1N833	S	Detector	X		
1N833A	S	Detector	X		
1N918	S	Mixer	Ku		
1N1132	S	Mixer	S-X	9.5	

MICROWAVE AND UHF DIODES

1N1610-1N5906

TYPE	MATERIAL	FUNCTION	FREQUENCY BAND	NF dB	f GHz
1N1610	S	Detector	S-X		
1N1611	S	Detector	C-X		
1N1611A	S	Detector	C-X		
1N1611B	S	Detector	C-X		
1N1838	G	Mixer	X-Ku	32	
1N2102	S	Detector	L-S		
1N2127	S	Detector	L-X		
1N2127A	S	Detector	L-X		
1N2509	S	Mixer	C	10	
1N2510	S	Mixer	X	9.5	
1N2802	S	Mixer	X	7.5	
1N2926		Detector	X-K		
1N2926A		Detector	X-K		
1N3093	G	Switch	X		
1N3143	G	Detector	C-X		
1N3481	G	Switch, Power	RF		9.0
1N3482	G	Switch, Power	RF		9.0
1N3655	S	Mixer	S	8.3 to 6.0	
1N3655A	S	Mixer	S	8.3 to 6.0	
1N3655B	S	Mixer	S	8.3 to 6.0	
1N3733	S	Mixer	S		
1N3745	S	Mixer	X	9.5	
1N3746	S	Mixer	X	8.5	
1N3747	S	Mixer	X	7.5	
1N3778	S	Detector	C-X		
1N4294	S	Mixer	S		
1N4379	S	Detector	S		
1N4600	S	Mixer		9.5	13.3
1N4601	S	Mixer		8.8	13.3
1N4602	S	Mixer		8.0	13.3
1N4603	S	Mixer		9.5	16
1N4604	S	Mixer		8.8	16
1N4605	S	Mixer		8.0	16
1N4939	G	Mixer	Ka	10.5	
1N4940	G	Mixer	Ka	6.5	9.37
1N5165	S	Mixer, Detector			
1N5166	S	Mixer, Detector			
1N5167	S	Mixer, Detector			
1N5168	S	Mixer, Detector		6.5	2.0
1N5169	S	Mixer, Detector		7.0	2.0
1N5436		Mixer			
1N5437		Mixer			
1N5438		Mixer			
1N5764		Mixer		7.0	17
1N5906		Mixer		7.0	17

2N ... 3N ... & 4N JEDEC REGISTERED DEVICES

INDEX

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NUMERICAL INDEX

The following table provides a master numerical index for all registered 2N, 3N, and 4N type numbers. Short-form specifications are also listed for junction (bipolar) transistors. To facilitate comparison, non-conforming specifications have been converted to conform to those chosen. Conversion methods and preferences are indicated under the individual characteristics in the key.

Short-form specifications for semiconductor devices other than junction transistors are found in the tables beginning on page 2-86 . Included in these tables are Reference Amplifiers, Thyristors, Field-Effect Transistors, Unijunction Transistors, and Optoelectronic devices which are identified in the use column.

Data sheets in Volumes One and Two are arranged in alpha-numeric order. The Motorola device number in the Reference column refers to the first number listed on the data sheet where the EIA number or replacement part number is located.

KEY

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min Typ*	C_{ob} pF Max Typ*	t_{on} / t_{off} ns Max Typ*	PACKAGE TO- No.	Case No.

TYPE NO.: Numerical Listing of JEDEC Registered Type Numbers
***Available from Motorola**

MATERIAL:
S – Silicon
G – Germanium

POLARITY:
N – NPN
P – PNP

REPLACEMENT: Type number of recommended replacement or of nearest electrical equivalent.

REFERENCE: First type number on data sheet where the EIA or replacement part number is located.
OR
Table number where short-form specifications are located.

USE CODE

A	Amplifier
AH	Amplifier, High frequency
AHP	Amplifier, High frequency power
AL	Amplifier, Light sensitive
AM	Amplifier, Multiple device
AP	Amplifier, Power
AS	Amplifier, Switch
ASM	Amplifier, Switch multiple device
ASP	Amplifier, Switch power
S	Switch
SAH	Switch, Amplifier high frequency
SC	Switch, Chopper
SH	Switch, High speed
SHP	Switch, High speed power
SM	Switch, Multiple device
SP	Switch, Power

PRODUCT CODE

FET	Field-Effect Transistor
OPT	Optoelectronic Device
PUT	Programmable Unijunction Transistor
R-A	Reference Amplifier
THY	Thyristor
UJT	Unijunction Transistor

P_D: Power Dissipation. Normally specified at 25°C but occasionally specified at higher temperatures.

REF. POINT:
A – Ambient Temperature
C – Case Temperature

V_{CE}: Rated maximum Collector-Emitter Voltage. Subscript letter identifies base termination listed below in order of preference.

SUBSCRIPT:
O – V_{CEO}, open
R – V_{CER}, resistance only
X – V_{CEX}, reverse bias and resistance
V – V_{CEV}, reverse bias only
S – V_{CES}, shorted
U – V_{CE}, unidentified
B – V_{CBO}, Collector-Base Voltage, emitter open

I_C: DC Collector Current

h_{FE}: Common-emitter DC Current Gain. When not specified, h_{fe} (ac gain) is shown or h_{FE} is calculated from:
h_{FB}, common base dc gain,
h_{fb}, common base ac gain,
or from the
I_C and I_B values used for a saturation voltage test.
Units from test current:
A – ampere
m – mA
* – μA

f_T: Current-Gain–Bandwidth Product. When specified, indicated by T. When f_T is not specified, the actual specification is indicated by a letter code and f_T is computed as follows:
B: $f_{\alpha b}$, $f_T = f_{\alpha b} \times 0.8$
E: $f_{\alpha e}$, $f_T = f_{\alpha e} \times (h_{FE}$ or $h_{fe})$ min
M: f_{max} is shown as specified

C_{ob}: Output Capacitance, common-base. Shown without distinction:
C_{cb} – Collector-Base Capacitance
C_{re} – Common-Emitter Reverse Transfer Capacitance

t_{on}/t_{off}: Turn-On/Turn-Off Time

PACKAGE: JEDEC Transistor Outline/ Motorola Package Outline

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No.	PACKAGE Case No.
2N21		P			S	0.12	A	100	B								
2N22	G	P			S	0.145	A	100	0	0.02							
2N23	G	P			S	0.105	A	50	0	0.04							
2N24	G	P			A	0.145	A	30	0	0.02							
2N25	G	P			AH	0.2	A	50	0	0.02			2.4 B				
2N26	G	P			S	0.09	A	40	0	0.04							
2N27		N			A	0.05	A	35	B		19	1.0 m	0.8 B				
2N28		N			A	0.05	A	30	B		16	0.5 m	0.4 B				
2N29		N			A	0.05	A	35	B		24	1.0 m	0.8 B				
2N30	G	P			A	0.1	A	35	B	0.007							
2N31	G	P			A	0.1	A	35	B	0.007			2.4 B				
2N32	G	P			S	0.05	A	40	B	0.008			2.2 B				
2N32A	G	P			S	0.05	A	40	B								
2N33	G	P			AH	0.03	A	8	B	0.007							
2N34	G	P	2N1191	2N1191	A	0.05	A	25	B	0.008							
2N34A	G	P			A	0.05	A	25	B	0.008							
2N35	G	P			A	0.05	A	25	B	0.008							
2N35A	G	N															
2N36	G	P	2N1191	2N1191	A	0.05	A	20	V								
2N37	G	P	2N1191	2N1191	A	0.05	A	20	V								
2N38	G	P	2N1191	2N1191	A	0.05	A	20	V								
2N38A	G	P			A	0.05	A	20		0.008							
2N41	G	P			A	0.050	A	25	B								
2N43	G	P			A	0.240	A	30	0	0.3	34	20 m	0.4 B				
2N43A	G	P	2N525	2N524	A	0.240	A	30	0	0.3	34	20 m	0.4 B				
2N44	G	P	2N524	2N524	A	0.240	A	30	0	0.3	18	20 m	0.4 B				
2N45	G	P	2N524	2N524	A	0.240	A	30	0	0.3	18	20 m	0.4 B				
2N46	G	P			A	0.050	A	25	B								
2N47	G	P	2N1191	2N1191	A	0.050	A	35	B	0.02	39	1.0 m					
2N48	G	P			A	0.050	A	35	B	0.02	32	1.0 m					
2N49	G	P	2N1191	2N1191	A	0.050	A	35	B	0.02	39						
2N50	G				S	0.050	A	15	B	0.001							
2N51	G				S	0.1	A	50	B	0.008							
2N52	G				S	0.12	A	50	B	0.008							
2N53	G				S	0.1	A	50	B	0.008							
2N54	G	P	2N1191	2N1191	A	0.2	A	45	B	0.01	19	1.0 m					
2N55	G	P	2N1191	2N1191	A	0.2	A	45	B	0.01	12	1.0 m					
2N56	G	P	2N1191	2N1191	A	0.2	A	45	B	0.01	9	1.0 m					
2N57	G	P			AP	20	C	60	B	0.8							
2N59	G	P	2N1193	2N1191	A	0.180	A	25	0	0.2							
2N59A	G	P	2N1193	2N1191	A	0.180	A	40	0	0.2							
2N59B	G	P	2N1193	2N1191	A	0.180	A	50	0	0.2							
2N59C	G	P	2N1193	2N1191	A	0.180	A	60	0	0.2							
2N60	G	P	2N1193	2N1191	A	0.180	A	25	0	0.2							
2N60A	G	P	2N1193	2N1191	A	0.180	A	40	0	0.2							
2N60B	G	P	2N1193	2N1191	A	0.180	A	50	0	0.2							
2N60C	G	P	2N1193	2N1191	A	0.180	A	60	0	0.2							
2N61	G	P	2N1192	2N1191	A	0.180	A	25	0	0.2							
2N61A	G	P	2N1191	2N1191	A	0.180	A	40	0	0.2							
2N61B	G	P	2N1191	2N1191	A	0.180	A	50	0	0.2							
2N61C	G	P	2N1191	2N1191	A	0.180	A	60	0	0.2							
2N62	G	P	2N1191	2N1191	A	0.050		35	B	0.02							
2N63	G	P	2N1191	2N1191	A	0.102	A	44	S	0.01							
2N64	G	P	2N1191	2N1191	A	0.102	A	30	S	0.01							
2N65	G	P	2N1193	2N1191	A			24	S	0.01							
2N66		P			AP	27.5	C	40		0.8							
2N67		P			S	0.1	A	50	B								
2N68	G	P			AP	2.0	A	25	B								
2N71		P			AP	1.0	A	50	U	0.25							
2N72	G	P			S	0.050	A	40	B								
2N73		P			SC	0.2	A	50	U	0.015							
2N74		P			S	0.2	A	50	U	0.05							
2N75		P			S	0.2	A	20	U								
2N76	G	P	2N319	2N319	A	0.005		20	B	0.01			0.4 B				
2N77	G	P	2N1191	2N1191	A	0.035	A	25	B	0.015							
2N78	G	N			AH	0.065	A	15	0	0.02	45	1.0 m	4.0 B				
2N78A	G	N			AH	0.065	A	15	0	0.02	45	1.0 m	4.0 B				
2N79	G	P	2N1191	2N1191	A	0.035	A	35	B								
2N80	G	P			A	0.050	A	25	U	0.008							
2N81	G	P	2N1191	2N1191	A	0.050	A	20	0	0.015	20	1.0 m					

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No.	Case No.
2N82	G	P	2N1191	2N1191	A	0.035	A	20	0	0.15	20	1.0 m					
2N94	G	N			AH	0.03	A	20	B	0.005	20	1.0 m	1.6 B				
2N94A	G	N			AH	0.03	A	20	B	0.005	20	1.0 m	4.0 B				
2N95		N			AP	2.5	A	25	B	1.5							
2N96	G	P			A	0.050	A	30	B	0.02			0.4 B				
2N97	G	N			A	0.050	A	30	B	0.01	6	1.0 m	0.4 B	25	200/300		
2N97A	G	N			A	0.050	A	40	B	0.01	13	1.0 m	0.4 B	25	200/300		
2N98	G	N			A	0.050	A	40	B	0.01	19	1.0 m	0.64 B	25	200/300		
2N98A	G	N			A	0.050	A	40	B	0.01	24	1.0 m	0.64 B	25	200/300		
2N99	G	N			A	0.050	A	40	B	0.01	19	1.0 m	1.6 B	20	200/300		
2N100		N			A	0.025	A	25	B	0.005	99	1.0 m	2.0 B	20	200/300		
2N101	G	P			AP	1.0	A	25	B	1.5							
2N102	G	N			AP	1.0	A	25	B	1.5							
2N103	G	N			A	0.050	A	35	B								
2N104	G	P	2N650	2N650	A	0.150	A	30	B	0.05							
2N105	G	P			A	0.035	A			0.015							
2N106	G	P	2N1191	2N1191	A	0.102	A	6	U	0.01	25	0.5 m					
2N107	G	P	2N464	2N464	A	0.050	A	6	0	0.01							
2N108	G	P			A	0.05	A			0.015							
2N109	G	P	2N1192	2N1191	A	0.165	A	25	0	0.15	65	50 m				40/	
2N110	G	P			S	0.2	A	50	B	0.04							
2N111	G	P			AH	0.150	A	15	0	0.2	15	1.0 m					
2N111A	G	P			AH	0.150	A	15	0	0.2	15	1.0 m					
2N112	G	P			AH	0.150	A	15	0	0.2	15	1.0 m					
2N112A	G	P			AH	0.150	A	15	0	0.215		1.0 m					
2N113	G	P			AH	0.096	A	10	B	0.005							
2N114	G	P			AH	0.096	A	10	B	0.005							
2N115	G	P			SP	50	C	32	R			30 m					
2N117	S	N			SH	0.150	C	30	B	0.025			0.8 B				
2N118	S	N			SH	0.150	C	30	B	0.025			1.6 B				
2N118A	S	N			SH	0.150	C	45	B	0.025							
2N119	S	N			SH	0.150	C	30	B	0.025			1.6 B				
2N120	S	N			AH	0.150	C	45	B		76						
2N122	S	N			AP	8.75	C	120	B		3	100 m					
2N123	G	P			SH	0.05	C	15	0	0.125			4.0 B				
2N124	G	N			S	0.05	A	10	B	0.008	12	5.0 m	0.3 T				
2N125	G	N			S	0.05	A	10	B	0.008	24	5.0 m	5.0 T				
2N126	G	N			S	0.05	A	10	B	0.008	48	5.0 m	5.0 T				
2N127	G	N			S	0.05	A	10	B	0.008	100	5.0 m	5.0 T				
2N128	G	P			AH	0.03	A			0.005			45 M				
2N129	G	P			AH	0.03	A			0.005			30 M				
2N130	G	P	2N1191	2N1191	A	0.085	A	44	B	0.01							
2N130A	G	P	2N650	2N650	A	0.1	A	40	0	0.1							
2N131	G	P	2N1192	2N1191	A	0.085	A	30	B	0.01							
2N131A	G	P	2N651	2N650	A	0.1	A	30	0	0.2							
2N132	G	P	2N1192	2N1191	A	0.085	A	24	B	0.01							
2N132A	G	P	2N651	2N650	A	0.1	A	20	0								
2N133	G	P	2N1192	2N1191	A	0.085	A	30	B	0.01							
2N133A	G	P	2N651	2N650	A	0.1	A	20	0								
2N135	G	P			AH	0.1	A	12	R				3.6 B				
2N136	G	P			AH	0.1	A	12	R				5.2 B				
2N137	G	P			AH	0.1	A	6	R				8.0 B				
2N138	G	P			A	0.05	A	24	B	0.02							
2N138A	G	P			A	0.15	A	30	0	0.1	10	50 m					
2N138B	G	P			A	0.1	A	30	0	0.1							
2N139	G	P			A	0.035	A	16	B	0.015							
2N140	G	P			A	0.035	A	16	B	0.015							
2N141	G	P			AP	1.5	A	30	0	0.8							
2N142	G	N			AP	1.5	A	30	0	0.8	11	.25 A					
2N143	G	P			AP	1.0	A	30	0	0.8							
2N144	G	N			AP	1.0	A	30	0	0.8							
2N145	G	N			AH	0.065	A	20	U	0.005							
2N146	G	N			AH	0.065	A	20	U	0.005							
2N147	G	N			AH	0.065	A	20	U	0.005							
2N148	G	N			AH	0.065	A	16	U	0.005							
2N148A	G	N			AH	0.065	A	32	U	0.005							
2N149	G	N			AH	0.065	A	16	U	0.005							
2N149A	G	N			AH	0.065	A	32	U	0.005							
2N150	G	N			AH	0.065	A	16	U	0.005							
2N150A	G	N			AH	0.065	A	32	U	0.005							

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N155	G	P	2N3611	2N3611	AP	85	A	30	B	3.0	24	0.5 A				
2N156	G	P	2N3611	2N3611	AP	8.5	A	30	B	3.0	24	0.5 A	0.116 B			
2N157	G	P	2N3615	2N3615	AP	1.5	A	60	B	3.0	20	0.5 A	0.08 B			3/
2N157A	G	P	2N3616	2N3615	AP	1.5	A	90	B	3.0	20	0.5 A	0.08 B			3/
2N158	G	P	2N3615	2N3615	AP	8.5	A	60	B	3.0	21	0.5 A	0.116 B			
2N158A	G	P	2N2141	2N2137	AP	1.5	A	60	0	3.0	21	0.5 A	0.084 E			
2N159						0.08				0.01						
2N160	S	N				0.15	A	40	B	0.025	9					
2N160A	S	N			A	0.15	A	40	B	0.025	9					
2N161	S	N			A	0.15	A	40	B	0.025	19					
2N161A	S	N			A	0.15	A	40	B	0.025	19					
2N162	S	N	2N2221	2N2218	A	0.15	A	40	B	0.025	19					
2N162A	S	N	2N2221	2N2218	A	0.15	A	40	B	0.025	19					
2N163	S	N	2N2221	2N2218	A	0.15	A	40	B	0.025	39					
2N163A	S	N	2N2221	2N2218	A	0.15	A	40	B	0.025	39					
2N166	G	N			AH	0.025	A	6.0	0	0.02						
2N167	G	N			AH	0.075	A	30	0	0.075			4.0 B			
2N167A	G	N			SH	0.075	A	30	0		17	8.0 m	4.0 B			
2N168	G	N			AH	0.055	A	15	0	0.02						
2N168A	G	N			AH	0.065	A	15	0	0.02						
2N169	G	N			AH	0.055	A	15	0	0.02						
2N169A	G	N			A	0.055	A	25	0	0.02						
2N170	G	N			AH	0.025	A	6	0	0.02						
2N172	G	N			AH	0.065	A	16	U	0.005						
★2N173	G	P		2N277	AP	170	C	50	S		35	5.0 A			15k/15k	36/5
★2N174	G	P		2N174	SP	100	C	70	S		25	5.0 A			15k/15k	36/5
2N174A	G	P		2N174	SP	100	C	70	S	15	40	1.2 A	0.08 B		15k/15k	
2N175	G	P	2N1192	2N1191	AH	0.05	A	10	B	0.002						
★2N176	G	P		2N176	AH	90	C	30	R	3.0	25	0.5 A	0.1 E			
★2N178	G	P		2N178	A	10	C	30	R	3.0	15	0.5 A	0.175 E			3/
2N179	G	P	2N3611	2N3611	A	0.3	C			0.06						
2N180	G	P	2N1192	2N1191	A	0.15	A	30	B							
2N181	G	P	2N1192	2N1191	A	0.25	A	30	B							
2N182	G	N			S	0.1	A	25	B							
2N183	G	N			S	0.1	A	25	B							
2N184	G	N			S	0.1	A	25	B							
2N185	G	P	2N650	2N650	A	0.150	A	20	B	0.150						
2N186	G	P	2N1191	2N1191	A	0.075	A	25	R	0.2			0.64 B			
2N186A	G	P	2N1191	2N1191	A	0.18	A	25	R	0.2			0.64 B			
2N187	G	P	2N1191	2N1191	A	0.075	A	25	R	0.2			0.8 B			
2N187A	G	P	2N1191	2N1191	A	0.18	A	25	R	0.2			0.8 B			
2N188	G	P	2N1191	2N1191	A	0.075	A	25	R	0.2			0.96 B			
2N188A	G	P	2N1191	2N1191	A	0.18	A	25	R	0.2			0.96 B			
2N189	G	P	2N1191	2N1191	A	0.075	A	25	R	0.05			0.64 B			
2N190	G	P	2N1191	2N1191	A	0.075	A	25	R	0.05			0.8 B			
2N191	G	P	2N1192	2N1191	A	0.075	A	25	R	0.05			0.96 B			
2N192	G	P	2N1193	2N1191	A	0.075	A	25	R	0.05			1.2 B			
2N193	G	N			AH	0.15	A	18	R	0.1	10	1.0 m	1.6 B	15		22/
2N194	G	N			AH	0.05	A	15	R				1.6 B			
2N194A	G	N			AH	0.05	A	20	R				1.6 B			
2N206	G	P			A	0.075	A	30	B							
2N207	G	P	2N1191	2N1191	A	0.05	A	12	V	0.02						
2N207A	G	P	2N1193	2N1191	A	0.05	A	12	V	0.02						
2N207B	G	P	2N1190	2N1189	A	0.05	A	12	V	0.02						
2N211	G	N			AH	0.05	A	10	R				2.0M E			22/
2N212	G	N			AH	0.15	A	18	R	0.1	10	1.0 m	3.2 B			
2N213	G	N			A	0.05	A	25	R	0.1	80	1.0 m	2.4 B			
2N213A	G	N			A	0.18	A	25	R	0.1				10		
2N214	G	N			A	0.125	A	40	B		50	35 m	0.48 B			
2N215	G	P	2N1189	2N1189	A	0.15	A	30	B							
2N216	G	N			AH	0.05	A	15	U				1.6 B			
2N217	G	P	2N1192	2N1191	A	0.15	A	25	0		65	50 m				
2N218	G	P			A	0.035	A	16	B	0.015						
2N219	G	P			A	0.035	A	16	B	0.015						
2N220	G	P	2N1189	2N1189	A	0.02	A	10	B	0.002						
2N223	G	P	2N1193	2N1191	A	0.1	A	18	V	0.15						
2N224	G	P	2N1192	2N1191	A	0.25	A	25	B	0.15	60	100 m				
2N225	G	P	2N1193	2N1191	A	0.25	A	25	B	0.15	60	100 m				
2N226	G	P	2N1192	2N1191	A	0.25	A	30	B	0.15	35	100 m				
2N227	G	P	2N1192	2N1191	A	0.25	A	30	B	0.15	35	100 m				

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N228	G	P			A	0.05	A	25	U		50	35 m	0.48 B			
2N229	G	N			A	0.05	A	12	U	0.04			0.44 B			
2N230	G	P			AP	15	C	30	U	2.0	60	0.5 A	0.72 E			
2N231	G	P			AH	0.009	A	4	V				30M M			
2N232	G	P			AH	0.009	A	4	V				20M M			
2N233	G	N			AH	0.05	A	10	B							
2N233A	G	N			AH	0.05	A	10	B							
2N234	G	P	2N3611	2N3611	AP	25	C	25	R	3.0						
2N234A	G	P	2N3611	2N3611	AP	25	C	25	R	3.0						
2N235	G	P	2N3611	2N3611	AP	25	C	40	U	3.0						
2N235A	G	P			AP	25	C	40	U	3.0						
2N235B	G	P			AP	30	C	35	R	3.0	10	1.0 A	0.05 E			
2N236	G	P	2N3612	2N3611	AP			35	R							
2N236A	G	P	2N3612	2N3611	AP	25	C	35	R		40	.75 A				
2N236B	G	P	2N3612	2N3611	AP	35		35	R	3.0			0.05 E			
2N237	G	P			A	0.15	A	45	B	0.02			0.4 B			
2N238	G	P	2N1192	2N1191	A	0.05	A	20	B							
2N240	G	P			S	0.025	A	6	S	0.015			25 T			
2N241	G	P	2N321	2N319	A	0.1	A	25	R	0.2			1.04 B			
2N241A	G	P	2N321	2N319	A	0.18	A	25	R	0.2			1.04 B			
★2N242	G	P		2N242	A	2.0	C	45	R	5.0	30	500 m	0.15 E			3/
2N243	S	N			A	0.75	C	60	B							
2N244	S	N			A	0.75	C	60	B							
2N247	G	P			AH	0.08	A	40	B							
2N248	G	P			A			25	B							
2N249	G	P			A	0.35	A	25	B	0.2						
2N250	G	P	2N3611	2N3611	AP	12	C	30	B	2.0	30	500 m	0.24 E			
2N250A	G	P	2N3611	2N3611	AP	90	C	35	V	7.0	25	3.0 A	0.2 T			3/
2N251	G	P	2N3612	2N3611	AP	12	C	60	B	2.0	30	500 m	0.24 E			
2N251A	G	P	2N3616	2N3615	AP	90	C	55	V	7.0	25	3.0 A	0.2 T			3/
2N252	G	P			AH	0.065	C	16	0	0.005						
2N253	G	N			AH	0.065	C	12	0	0.005						
2N254	G	N			AH	0.065	C	20	0							
2N255	G	P			AP	1.5	A	15	B	3.0						3/
2N255A	G	P			AP	20	C	15	R	4.0						
2N256	G	P	2N3611	2N3611	AP	1.5	A	30	B	3.0						3/
2N256A	G	P	2N178	2N178	AP	20	C	25	R	4.0						
2N257	G	P			AP	25	C	40	B							
2N258	S	P			A	0.25	A	30	0	0.05				40		
2N259	S	P			A	0.25	A	30	0	0.05				40		
2N260	S	P			A	0.2	A	10	B	0.05						
2N260A	S	P			A	0.2	A	30	B	0.05						
2N261	S	P			A	0.2	A	75	B	0.05						
2N262	S	P			A	0.2	A	10	B	0.05						
2N262A	S	P			A	0.2	A	30	B	0.05						
2N263	S	N			A	0.15	A	30	0	0.02	45	10 m	16 B			
2N264	S	N			A	0.125	A	30	0	0.02	20	10 m	8.0 B			
2N265	G	P	2N1175	2N1413	A	0.075	A	25	R	0.05			1.2 B			
2N266	G	P			A	0.075	A	18	R	0.2			0.64 B			
2N267	G	P			AH	0.08	A	85	B							
2N268	G	P	2N3615	2N3615	AP	25	C	85	B							
2N268A	G	P			SP	10	C	60	V		20	2.0 A				
2N269	G	P			S	0.12	A	24	0	0.1						
2N270	G	P	2N1193	2N1191	A	0.15	A	25	B	0.075						
2N271	G	P			AH	0.15	A	10	0	0.2						
2N271A	G	P			AH	0.15	A	10	0	0.2						
2N272	G	P			A	0.15	A	24	0	0.1						
2N273	G	P			A	0.15	A	25	S	0.1	30	50 m				
2N274	G	P			AH	0.12	A	40	0	0.01	20	1.5 m				
★2N277	G	P		2N277	AP	70	C	40	S		35	5.0 A				36/5
★2N278	G	P		2N277	AP	70	C	45	S		35	5.0 A				36/5
2N279	G	P	2N650	2N650	A	0.125	A	20	0	0.01						
2N280	G	P	2N650	2N650	A	0.125	A	20	0	0.01						
2N281	G	P	2N651	2N650	A	0.167	C	16	R	0.05	45		0.28 B			
2N282	G	P	2N651	2N650	A	0.167	C	16	R	0.05						
2N283	G	P	2N650	2N650	S	0.125	A	20	B	0.01						
2N284	G	P			S	0.125	A	32	B	0.125	15		0.28 B			
2N284A	G	P			S	0.125	A	60	B	0.125	15		0.28 B			
2N285	G	P	2N3617	2N3615	AP	25	C	35	R							
2N285A	G	P			AP	25	C	35	R							

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No. Case No.
2N290	G	P			AP	55	C	70	B	12						
2N291	G	P	2N1191	2N1191	A	0.180	A	25	B							
2N292	G	N			AH	0.065	A	15	O	0.02	6					
2N293	G	N			AH	0.065	A	15	O	0.02	6					
2N296	G	P	2N3615	2N3615	A	20	C	60	B	2.0	19	1.0 A	0.08 E			
2N297	G	P	2N297A	2N297A	AP	35	C	50	S	5.0	40	0.5 A	0.2 E			
★2N297A	G	P		2N297A	AP	35	C	50	S	5.0	40	0.5 A	0.2 E			3/
2N299	G	P			AH	0.02	A	4	V				90 M			
2N300	G	P			AH	0.02	A	4	V				85 M			
2N301	G	P			AP	11	C	40	B	1.5	70	1.0 A				3/
2N301A	G	P			AP	11	C	60	B	1.5	70	1.0 A				3/
2N302	G	P			AH	0.15	A	10	O	0.2			5.6 B			
2N303	G	P			AH	0.15	A	10	O	0.2			11.2 B			
2N306	G	N			A	0.05	A	15	R				0.48 B			
★2N307	G	P		2N242	AP	25	C	35	R	1.0	20	0.2 A	0.06 E			3/
★2N307A	G	P		2N242	AP	25	C	35	R	2.0	20	0.2 A	0.07 E			3/
2N308	G	P			AH	0.03	A	20	O							
2N309	G	P			AH	0.03	A	20	O							
2N310	G	P			AH	0.03	A	30	O							
2N311	G	P			SP	0.075	A	15	O		25	10 m				
2N312	G	N			SP	0.075	A	15	O		25	10 m				
2N315	G	P			S	0.1	A	15	O		15	100 m				
2N315A	G	P			S	0.15	A	20	O	0.5	20	100 m				5/
2N315B	G	P			S	0.15	A	20	O	0.5	20	100 m			1.2/1.6	5/
2N316	G	P			S	0.1	A	10	O	0.5	20	200 m				
2N316A	G	P			S	0.15	A	15	O		20	200 m			0.7/0.15	5/
2N317	G	P			S	0.1	A	6	O	0.5	20	400 m				
2N317A	G	P			S	0.15	A	10	O		20	400 m			0.6/0.12	5/
2N318	G	P			AL	0.05	A	12	B							
★2N319	G	P		2N319	A	0.225	A	20	R	0.5	25	20 m		35		5/31
★2N320	G	P		2N319	A	0.225	A	20	R	0.5	34	20 m		35		5/31
★2N321	G	P		2N319	A	0.225	A	20	R	0.5	53	20 m		35		5/31
★2N322	G	P		2N322	A	0.14	A	18	R	0.5	34	20 m	0.8 B	35		5/31
★2N323	G	P		2N322	A	0.14	A	18	R	0.5	53	20 m	1.2 B	35		5/31
★2N324	G	P		2N322	A	0.14	A	18	R	0.5	72	20 m	1.6 B	35		5/31
2N325	G	P	2N3611	2N3611	A	12	C	35	S		30	500 m	0.12 B			
2N326	G	N			A	7.0	C	35	S		30	500 m	0.12 B			
2N327	S	P	2N2906	2N2904	A	0.35	A	50	B	0.05						
2N327A	S	P	2N2906	2N2904	AM	0.385	A	40	O	0.1	9	3.0 m				
2N327B	S	P	2N2906	2N2904	AM	0.385	A	40	O		9	3.0 m				
2N328	S	P			A	0.35	A	35	B	0.05						
2N328A	S	P			AM	0.385	A	35	O	0.1	18	3.0 m				
2N328B	S	P			AM	0.385	A	35	O		18	3.0 m				
2N329	S	P			A	0.35	A	30	B	0.05						
2N329A	S	P		2N2904	AM	0.385	A	30	O	0.1	36	3.0 m				
2N329B	S	P		2N2904	AM	0.385	A	30	O		36	3.0 m				
2N330	S	P		2N2904	A	0.35	A	45	B	0.05						
2N330A	S	P	2N2906	2N2904	AM	0.385	A	30	O	0.1						
★2N331	G	P		2N331	A	0.2	A	40	O	0.01	20	1.5 m		50		5/31
2N332	S	N	2N2221	2N2218	AH	0.15	A	45	B		9					5/
2N332A	S	N	2N2218	2N2218	A	0.5	A	45	O	0.025			2.0 B	15		5/
2N333	S	N	2N2221	2N2218	AH	0.15	A	45	B		18					
2N333A	S	N	2N2218	2N2218	A	0.5	A	45	O	0.025			2.0 B	15		5/
2N334	S	N	2N2221	2N2218	AH	0.15	A	45	B		18					5/
2N334A	S	N	2N2218	2N2218	A	0.5	A	45	O	0.025			6.4 B	15		5/
2N334B	S	N	2N2218	2N2218	A	0.5	A	60	O	0.025	15	1.0 m	6.4 B	15		5/
2N335	S	N	2N2221	2N2218	AH	0.15	A	45	B		36					
2N335A	S	N	2N2218	2N2218	A	0.5	A	45	O	0.025			2.0 B	15		5/
2N335B	S	N	2N2218	2N2218	A	0.5	A	60	O	0.025	28	1.0 m	2.0 B	15		5/
2N336	S	N	2N2221	2N2218	AH	0.15	A	45	B		76					
2N336A	S	N	2N2218	2N2218	A	0.5	A	45	O	0.025			2.0 B	15		5/
2N337	S	N	2N2221	2N2218	S	0.125	C	45	B		20	10 m	8.0 B			
2N337A	S	N	2N2218	2N2218	A	0.5	A	45	B	0.02	20	10 m	12 B			5/
2N338	S	N	2N2221	2N2218	S	0.125	C	45	B		45	10 m	16 B			
2N338A	S	N	2N2218	2N2218	A	0.5	A	45	B	0.02	45	10 m	20 B			5/
2N339	S	N			A	1.0	C	55	O							
2N339A	S	N			AH	3.0	A	60	O	0.15	20		10 T	50		11/
2N340	S	N			A	1.0	C	85	O							
2N340A	S	N			AH	3.0	A	85	O	0.15	20		10 T	50		11/
2N341	S	N			A	1.0	C	85	O							

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No. Case No.
2N341A	S	N			AH	3.0	A	125	0	0.15	20		10 T	50		11/
2N342	S	N			A	1.0	C	60	0	0.06	9	5 m				11/
2N342A	S	N			A	1.0	C	85	0	0.06	9	5 m				11/
2N342B	S	N			A	1.0	C	85	0	0.06		m				11/
2N343	S	N			A	1.0	C	60	0	0.06	28	5 m				11/
2N343A	S	N			A	1.0	C	60	0	0.06	28	5 m				11/
2N343B	S	N			A	1.0	C	65	0	0.06						11/
2N344	G	P			AH	0.02	A	5	V	0.005			30 M			
2N345	G	P			AH	0.02	A	5	V	0.005			30 M			
2N346	G	P			AH	0.02	A	5	V	0.005			60 M			
2N350	G	P			AP	10	C	30	S	3.0	20	700 m	0.1 E			
2N350A	G	P		2N350A	AP	90	C	40	S		20	0.7 A	0.1 E			3/
2N351	G	P			AP	10	C	30	S	3.0	25	700 m	0.129 E			
2N351A	G	P		2N350A	AP	90	C	40	S		25	0.7 A	0.125 E			3/
2N352	G	P	2N3615	2N3615	AP	25	C	40	R	2.0	30	1.0 A	0.3 E			
2N353	G	P	2N3615	2N3615	AP	30	C	40	R	2.0	40	1.0 A	0.28 E			
2N354	S	P	2N2906	2N2904	AH	0.15	A	25	U	0.05			8.0 M			
2N355	S	P	2N2906	2N2904	S	0.15	A	10	U	0.05			8.0 M			
2N356	G	N			S	0.1	A	18	0	0.5	20	100 m				
2N356A	G	N			S	0.15	A	20	0		20	100 m			2.1k/1.7k	5/
2N357	G	N			S	0.1	A	15	0	0.5	20	200 m				
2N357A	G	N			S	0.15	A	20	0		25	200 m			0.8k/.14k	5/
2N358	G	N			S	0.1	A	12	0		20	300 m				
2N358A	G	N			S	0.15	A	15	0		25	300 m			0.8k/.14k	5/
2N359	G	P			A	0.17	A	18	R	0.4	100	50 m				5/
2N360	G	P	2N1192	2N1191	A	0.17	A	30	R	0.4	50	50 m				5/
2N361	G	P	2N1191	2N1191	A	0.17	A	30	R	0.4	25	50 m				5/
2N362	G	P	2N1192	2N1191	A	0.17	A	18	0	0.2						5/
2N363	G	P	2N1192	2N1191	A	0.17	A	28	0	0.2						5/
2N364	G	N			S	0.15	A	30	B				0.8 B			
2N365	G	N			S	0.15	A	30	B				0.8 B			
2N366	G	N			S	0.15	A	30	B				0.8 B			
2N367	G	P	2N1191	2N1191	S	0.1	A	30	B				0.24 B			
2N368	G	P	2N1191	2N1191	S	0.1	A	30	B				0.32 B			
2N369	G	P	2N1191	2N1191	S	0.1	A	30	B				0.4 B			
2N370	G	P	2N3324	2N3323	AH	0.08	A	24	B							
2N371	G	P	2N3324	2N3323	AH	0.08	A	24	B							
2N372	G	P	2N3324	2N3323	AH	0.08	A	24	B							
2N373	G	P			AH	0.08	A	25	B							
2N374	G	P	2N3325	2N3323	AH	0.08	A	25	B							
★2N375	G	P		2N375	AP	58	C	60	S	3.0	35	1.0 A	0.245 E			
★2N376	G	P		2N350	AP	10	A	40	0	3.0	35	700 m				3/11
★2N376A	G	P		2N350A	AP	90	C	40	S		35	0.7 A	0.175 E			3/11
2N377	G	N			S	0.15	A	20	V	0.2	20	30 m	4.0 B			5/
2N377A	G	N			S	0.15	A	40	V		20	30 m				
★2N378	G	P		2N378	SP	50	C	20	B	5.0	40	2.0 A	0.2 E			3/
★2N379	G	P		2N378	SP	50	C	40	B	5.0	20	2.0 A	0.1 E			3/
★2N380	G	P		2N378	SP	50	C	30	B	5.0	30	2.0 A	0.150 E			3/
★2N381	G	P		2N381	A	0.2	A	25	R	0.4	35	20 m				5/31
★2N382	G	P		2N381	A	0.2	A	25	R	0.4	60	20 m				5/31
★2N383	G	P		2N381	A	0.2	A	25	R	0.4	75	20 m				5/31
2N384	G	P	2N3325	2N3323	AH	0.12	A	40	0		20	1.5 m				
2N385	G	N			S	0.15	A	25	R	0.2	30	30 m	3.2 B			
2N385A	G	N			S	0.15	A	40	V	0.2	30	30 m	3.2 B	20		
2N386	G	P			AP	0.5	C	60	V	3.0	20	2.5 A	0.14 E			
2N387	G	P			AP	0.5	C	80	V	3.0	20	2.5 A	0.12 E			
2N388	G	N			S	0.15	A	20	R	0.2	60	30 m	4.0 B			5/
2N388A	G	N			S	0.15	A	40	V		60	.30 m	4.0 B			
2N389	S	N	2N5068	2N5068	AP	85	C	60	R	3.0	12	1.0 A				
2N389A	S	N	2N5068	2N5068	AP	85	C	60	R		12	1.0 A	1.0 T			
2N392	G	P	2N3614	2N3611	AP	48	C	40	R	5.0	60	3.0 A				
2N393	G	P	2N967	2N960	S	0.025	A	6	S	0.05	20	50 m	25 T			
2N394	G	P			SH	0.15	A	10	0	0.2	20	10 m	3.2 B			
2N394A	G	P			SH	0.15	A	30	0	0.2	30	10 m	3.2 B	20		5/
2N395	G	P			SH	0.2	A	15	R	0.2	20	10 m	2.4 B			
2N396	G	P			SH	0.2	A	20	R	0.2	30	10 m	4.0 B			
2N396A	G	P			SH	0.2	A	20	0	0.2	30	10 m	4.0 B	20		5/
2N397	G	P			SH	0.2	A	15	R	0.2	40	10 m	8.0 B			
2N398	G	P		2N398	SP	0.05	A	105	S	0.2	20	5.0 m				5/31
2N398A	G	P		2N398	A	0.15	A	105	S	0.2	20	5.0 m				5/31

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N398B	G	P	2N2043	2N2042	SP	0.25	A	105	S	0.2	20	5.0 m	0.8 B			5/31
2N399	G	P	2N1536	2N1529	AP	25	C	35	R							
2N400	G	P	2N1536	2N1529	AP	35	C	20	0	3.0	40	0.5 A	0.12 E			3/
2N401	G	P	2N3611	2N3611	AP	25	C	35	R							
2N402	G	P	2N1191	2N1191	A	0.18	A	20	0							
2N403	G	P	2N1191	2N1191	A	0.18	A	20	0	0.2						
2N404	G	P			S	0.15	A	25	B	0.01						92/
2N404A	G	P			S	0.15	A	35	0		30	12 m	3.2 B	20		92/
2N405	G	P	2N322	2N322	A	0.15	A	71	B	0.035						
2N406	G	P	2N322	2N322	A	0.15	A	71	B	0.035						
2N407	G	P	2N324	2N322	A	0.15	A	71	B	0.07						
2N408	G	P	2N324	2N322	A	0.15	A	71	B	0.07						
2N409	G	P			AH	0.08	A	71	B	0.015						
2N410	G	P			AH	0.08	A	71	B							
2N411	G	P			AH	0.08	A	71	B	0.015						
2N412	G	P			AH	0.08	A	71	B							
2N413	G	P			AH	0.15	A	18	0	0.2						
2N413A	G	P			AH	0.15	A	15	0							
2N414	G	P			AH	0.15	A	15	0	0.2						
2N414A	G	P			AH	0.15	A	15	0							
2N414B	G	P			AH	0.2	A	24	V	0.4			3.2 B	14		5/31
2N414C	G	P			AH	0.2	A	24	V				3.2 B			
2N415	G	P			AH	0.15	A	10	0	0.2						
2N415A	G	P			AH	0.15	A	10	0							
2N416	G	P			AH	0.15	A	12	0	0.2						
2N417	G	P			AH	0.15	A	10	0	0.2						
2N418	G	P	2N3616	2N3615	SP	25	C	75	R		40	4.0 A				
2N419	G	P			AP	35	C	20	0	3.0	50	0.5 A	0.15 E			
2N420	G	P	2N3612	2N3611	SP	25	C	40	R		40	4.0 A				3/
2N420A	G	P	2N3616	2N3615	SP	25	C	65	R		40	4.0 A				
2N422	G	P	2N651	2N650	A	0.15	A	20	0	0.2						
2N422A	G	P	2N5069	2N5069	A	0.175	A	20	0	0.2						5/
2N424	S	N	2N5069	2N5069	AP	85	C	80	R		12	1.0 A				
2N424A	S	N			AP	85	C	80	R	3.0	12	1.0 A	1.0 T			
2N425	G	P			S	0.15	A	20	0	0.4	20		2.0 B	20		5/
2N426	G	P			S	0.15	A	10	0	0.4	30		2.4 B	20		5/
2N427	G	P			S	0.15	A	15	0	0.4	40		4.0 B	20		5/
2N428	G	P			S	0.15	A	12	0	0.4	60		8.0 B	20		5/
2N428A	G	P			S	0.15	A	18	0		80		8.0 B	20	0.85/1.10	5/
2N438	G	N			S	0.1	A	25	0		20	50 m	2.0 B			9/
2N438A	G	N			S	0.15	A	25	0		20	50 m	2.0 B			9/
2N439	G	N			S	0.1	A	20	0		30	50 m	4.0 B			9/
2N439A	G	N			S	0.15	A	20	0		30	50 m	4.0 B			9/
2N440	G	N			S	0.1	A	15	0		40	50 m	8.0 B			5/
2N440A	G	N			S	0.15	A	15	0		40	50 m	8.0 B			
★2N441	G	P		2N441	AP	70	C	40	S	15	20	5.0 A				
★2N442	G	P		2N441	AP	70	C	45	S	15	20	5.0 A				36/5
★2N443	G	P		2N441	AP	70	C	50	S	15	20	5.0 A				36/5
2N444	G	N			A	0.1	A	15	0				0.4 B			36/5
2N444A	G	N			A	0.15	A	25	0		20	20 m	0.4 B			5/
2N445	G	N			A	0.1	A	12	0				0.4 B			
2N445A	G	N			A	0.15	A	18	0		40	20 m	1.6 B			5/
2N446	G	N			S	0.1	A	10	0				4.0 B			
2N446A	G	N			S	0.15	A	15	0		60	20 m	4.0 B			5/
2N447	G	N			S	0.1	A	6	0				4.0 B			
2N447A	G	N			S	0.15	A	12	0		80	20 m	7.2 B			5/
2N447B	G	N			S	0.15	A	12	0		80	20 m	7.2 B			5/
2N448	G	N			AH	0.065	A	15	0		8.0	1.0 m				
2N449	G	N			AH	0.065	A	15	0		34	1.0 m				
2N450	G	P			SH	0.15	A	12	0		30	10 m	4.0 B			
2N456	G	P	2N456A	2N456A	AP	50	C	40	X							
2N456B	G	P			AP	50	C	30	0	7.0	30	5.0 A	0.2 T			3/
2N457	G	P			AP	50	C	60	X							3/
★2N457A	G	P		2N456A	AP	50	C	30	0	7.0	30	5.0 A	0.2 T			3/
2N457B	G	P			AP	50	C	40	0	7.0	30	5.0 A	0.2 T			3/
2N458	G	P			AP	50	C	80	X	5.0						
★2N458A	G	P		2N456A	AP	50	C	40	0	7.0	30	5.0 A	0.2 T			3/
2N458B	G	P			AP	50	C	45	0	7.0	30	5.0 A	0.2 T			3/
★2N459	G	P		2N376A	SP	50	C	60	B	5.0	20	2.0 A	0.1 E			3/
★2N459A	G	P		2N376A	SP	106	C	60	0	5.0	40	2.0 A	0.2 E			3/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N460	G	P		2N460	A	0.2	A	35	R	0.4	16			2.0		5/31
★2N461	G	P		2N460	A	0.2	A	35	R	0.4	32			20		5/31
2N462	G	P			S	0.15	A	40	B	0.2	20	200 m	0.4 B			
2N463	G	P	2N1551	2N1539	AP	37.5	C	60	B		20	2.0 A	0.08 E			
★2N464	G	P		2N464	A	0.15	A	40	R	0.2						5/31
★2N465	G	P		2N464	A	0.15	A	30	R	0.2						5/31
★2N466	G	P		2N464	A	0.15	A	20	R	.2						5/31
★2N467	G	P		2N464	A	0.15	A	15	R	0.2						5/31
2N469	G	P			AL	0.05	A	6.0	B		10	1.0 m				
2N469A	G	P			AL	0.05	A	15	R							1/
2N470	S	N	2N2221	2N2218	AH	0.2	A	15	0	0.025			8.0 T	10		5/
2N471	S	N	2N2221	2N2218	A	0.2	A	30	0	0.025			8.0 T	10		5/
2N471A	S	N	2N2221	2N2218	A	0.2	A	30	0	0.025			8.0 T	8.0		5/
2N472	S	N	2N2221	2N2218	AH	0.2	A	45	0	0.025			8.0 T	10		5/
2N472A	S	N	2N2221	2N2218	A	0.2	A	45	0	0.025			8.0 T	8.0		5/
2N473	S	N	2N2221	2N2218	A	0.2	A	15	0	0.025			8.0 T	8.0		5/
2N474	S	N	2N2221	2N2218	A	0.2	A	30	0	0.025			8.0 T	8.0		5/
2N474A	S	N	2N2221	2N2218	A	0.2	A	30	0	0.025	10		8.0 T	8.0		5/
2N475	S	N	2N2221	2N2218	A	0.2	A	45	0	0.025			8.0 T	8.0		5/
2N475A	S	N	2N2221	2N2218	A	0.2	A	45	0	0.025	10		8.0 T	8.0		5/
2N476	S	N	2N2221	2N2218	A	0.2	A	15	0	0.025			12 T	10		5/
2N477	S	N	2N2221	2N2218	A	0.2	A	30	0	0.025			12 T	10		5/
2N478	S	N	2N2221	2N2218	AH	0.2	A	15	0	0.025			20 T			5/
2N479	S	N	2N2221	2N2218	AH	0.2	A	30	0	0.025			20 T			5/
2N479A	S	N	2N2221	2N2218	A	0.2	A	30	0	0.025	10		20 T	8.0		5/
2N480	S	N	2N2221	2N2218	AH	0.2	A	45	0	0.025			20 T			5/
2N480A	S	N	2N2221	2N2218	A	0.2	A	45	0	0.025	10		20 T	8.0		5/
2N481	G	P			AH	0.15	A	12	0							
2N482	G	P			AH	0.15	A	12	0							
2N483	G	P			AH	0.15	A	12	0							
2N484	G	P			AH	0.15	A	12	0							
2N485	G	P			AH	0.15	A	12	0							
2N486	G	P			AH	0.15	A	12	0							
2N487	G	P			A	0.1	A	18	R	0.025	20	1.0 m	10 T	14		5/
2N489				TABLE10	UJT											
THRU																
2N494				TABLE10	UJT											
2N495	S	P			AH	0.15	A	25	U	0.05			8.0 T			
2N496	S	P			S	0.15	A	10	U	0.05	15	15 m	7.2 T			
2N497	S	N	2N4238	2N4237	A	4.0	C	60	0		12	200 m				
2N497A	S	N	2N4238	2N4238	A	5.0	C	60	0	0.5	12	200 m				5/31
2N498	S	N	2N5681	2N5681	A	4.0	C	100	0		12	200 m				
2N498A	S	N	2N5681	2N5681	A	5.0	C	100	0	0.5	12	200 m				5/31
★2N499	G	P		2N499	AH	0.03	A	18	0	0.05			120 T	2.5		1/149
★2N499A	G	P		2N499	AH	0.06	A	18	0	0.05			120 T	2.5		1/149
2N500	G	P	2N3323	2N3323	AH	0.05	A	15								30/
2N501	G	P			SH	0.06	A	12	S		20	10 m	90 T			
2N501A	G	P			SH	0.06	A	12	S	0.05	30	10 m	90 T			30/
★2N502	G	P		2N499	AH	0.06	A	20	S	0.05			220 T	2.0		9/
★2N502A	G	P		2N499	AH	0.075	A	30	S	0.05			220 T	1.6		5/31
★2N502B	G	P		2N499	AH	0.075	A	30	S	0.05				1.6		9/
2N503	G	P	2N3284	2N3283	AH	0.025	A	20	S	0.05			168 T			9/
2N504	G	P	2N3323	2N3323	AH	0.03	A	25	S	0.05	20	10 m	50 M			1/
2N506	G	P			A	0.05	A	40	B	0.1	25	50 m	0.48 B			
2N507	G	N			A	0.05	A	40	B	0.1	25	50 m	0.48 B			
★2N508	G	P		2N322	A	0.2	A	18	R	0.5	99	20 m	2.0 B	35		5/31
★2N508A	G	P		2N508A	A	0.2	A	30	S	0.2	100	20 m	2.0 B	35		5/31
2N509	G	P			AH	0.225	A	30	B				400 T			
2N511	G	P	2N1164	2N1162	AP	150	C	30	0	25	20	10 A	0.26 T			
2N511A	G	P	2N1164	2N1162	AP	150	C	40	0	25	20	10 A	0.26 T			
2N511B	G	P	2N1166	2N1162	SP	150	C	45	0	25	20	10 A	0.26 T			
2N512	G	P	2N1164	2N1162	AP	150	C	30	0	25	20	15 A	0.28 T			
2N512A	G	P	2N1164	2N1162	AP	150	C	40	0	25	20	15 A	0.28 T			
2N512B	G	P	2N1166	2N1162	SP	150	C	45	0	25	20	15 A	0.28 T			
2N513	G	P	2N1163	2N1162	AP	150	C	30	0	25	20	20 A	0.3 T			
2N513A	G	P	2N1165	2N1162	AP	150	C	40	0	25	20	20 A	0.3 T			
2N513B	G	P	2N1167	2N1162	SP	150	C	45	0	25	20	20 A	0.3 T			
2N514	G	P	2N1163	2N1162	SP	80	C	30	0	25	20	25 A	0.43 T			
2N514A	G	P	2N1165	2N1162	SP	80	C	40	0	25	20	25 A	0.43 T			
2N514B	G	P	2N1167	2N1162	SP	80	C	45	0	25	20	25 A	0.43 T			

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N515	G	N			AH	0.05	A	18	R	0.01			1.6 B			
2N516	G	N			AH	0.05	A	18	R	0.01			1.6 B			
2N517	G	N			AH	0.05	A	18	R	0.01			1.6 B			
2N518	G	P			S	0.15	A	12	0	0.125	60	10 m	8.0 B	16		
2N519	G	P			S	0.1	A	15	0				0.4 B			
2N519A	G	P			S	0.15	A	18	0		20	20 m	0.4 B			5/31
2N520	G	P			S	0.1	A	12	0				2.4 B			
2N520A	G	P			S	0.15	A	15	0		40	20 m	1.6 B			5/31
2N521	G	P			S	0.1	A	10	0				6.4 B			
2N521A	G	P			S	0.15	A	12	0		60	20 m	6.4 B			5/31
2N522	G	P			S	0.1	A	8.0	0				12 B			
2N522A	G	P			S	0.15	A	10	0		80	20 m	12 B			5/31
2N523	G	P			S	0.1	A	6.0	0				16.8 B			
2N523A	G	P			S	0.15	A	6.0	0		100	20 m	16.8 B			5/
★2N524	G	P		2N524	A	0.225	A	30	R	0.5	25	20 m	4.0 B	40		5/31
2N524A	G	P			A	0.225	A	30	R	0.5	25	20 m	4.0 B	40		5/
★2N525	G	P		2N524	A	0.225	A	30	R	0.5	34	20 m	4.4 B	40		5/31
2N525A	G	P		2N524	A	0.225	A	30	R	0.5	34	20 m	4.4 B	40		5/
★2N526	G	P		2N524	A	0.225	A	30	R	0.5	53	20 m	5.2 B	40		5/31
2N526A	G	P			A	0.225	A	30	R	0.5	53	20 m	5.2 B	40		5/
★2N527	G	P		2N524	A	0.225	A	30	R	0.5	72	20 m	5.6 B	40		5/31
2N527A	G	P			A	0.225	A	30	R	0.5	72	20 m	5.6 B	40		5/
2N528	G	P				2.5	C	40	0	1.0	20	0.5 A	0.24 E			5/
2N529	G	P				0.1	A	15	0							
2N530	G	P				0.1	A	15	0							
2N531	G	P				0.1	A	15	0							
2N532	G	P				0.1	A	15	0							
2N533	G	P				0.1	A	15	0							
2N534	G	P	2N1189	2N1189	A	0.025	A	50	U	0.025						
2N535	G	P	2N1192	2N1191	A	0.05	A	20	U	0.02						
2N535A	G	P	2N1192	2N1191	A	0.05	A	20	U	0.02						
2N535B	G	P			A	0.05	A	20	U	0.02						
2N536	G	P	2N1193	2N1191	S	0.05	A	20	U	0.03	100	30 m	0.8 B			
2N537	G	P			AH			30	B							
2N538	G	P	2N2140	2N2137	SP	34	C	60	0	3.5	20	2.0 A	4.0 E			
2N538A	G	P	2N2140	2N2137	SP	34	C	60	0	3.5	20	2.0 A	4.0 E			
2N539	G	P	2N3616	2N3615	SP	34	C	55	0	3.5	30	2.0 A	6.0 E			
2N539A	G	P	2N3616	2N3615	SP	34	C	55	0	3.5	30	2.0 A	6.0 E			
2N540	G	P	2N1551	2N1539	SP	34	C	55	0	3.5	45	2.0 A	9.0 E			
2N540A	G	P	2N1551	2N1539	SP	34	C	55	0	3.5	45	2.0 A	9.0 E			
2N541	S	N			AH	0.2	A	15	U	0.025			10 T	20		5/
2N541A	S	N			A	0.2	A	15	0	0.025	20		8.0 T	20		5/
2N542	S	N			AH	0.2	A	30	U	0.025			10 T	20		5/
2N542A	S	N			A	0.2	A	30	0	0.025	20		10 T	8.0		5/
2N543	S	N			AH	0.2	A	50	U	0.025			10 T	20		5/
2N543A	S	N			A	0.2	A	45	0	0.025	20		10 T	8.0		5/
2N544	G	P			AH	0.08	A	34	B	0.1						
2N545	S	N	2N4238	2N4237	AH	5	C	30	0	0.8	15	0.5 A		100		5/
2N546	S	N	2N4237	2N4237	AH	5	C	30	0	0.8	15	0.5 A		100		5/
2N547	S	N	2N4238	2N4237	AH	5	C	60	0	0.8	20	0.5 A	4.0 T	100		5/
2N548	S	N	2N4237	2N4237	AH	5	C	30	0	0.8	20	0.5 A	4.0 T	100		5/
2N549	S	N	2N4238	2N4237	AH	5	C	60	0	0.8	20	0.2 A	4.0 T	100		5/
2N550	S	N	2N4237	2N4237	AH	5	C	30	0	0.8	20	0.2 A	4.0 T	100		5/
2N551	S	N			AH	5	C	60	0	0.2	20	50 m	3.0 T	100		5/
2N552	S	N			AH	5	C	30	0	0.2	20	50 m	3.0 T	100		5/
2N553	G	P			SP	35	C	80	B	4.0	40	500 m				
★2N554	G	P		2N178	AP	40	C			3.0						3/
★2N555	G	P		2N178	AP	10	C	40	B	3.0						3/
2N556	G	N			S	0.1	A	20	X	0.2	35	1.0 m				
2N557	G	N			S	0.1	A	20	X	0.2	20	1.0 m				
2N558	G	N			S	0.1	A	15	X	0.2	60	1.0 m				
2N559	G	P		2N5591	S	0.15	A	15	S							
2N560	S	N			S	0.5	A	60	S	0.1	20	100 m				
2N561	G	P			A	50	A	50	0	5.0	20	4.0 A				
2N563	G	P	2N650	2N650	S	0.15	A	25	0		10					
2N564	G	P	2N650	2N650	S	0.12	A	25	0		10					
2N565	G	P	2N651	2N650	S	0.15	A	25	0		30					
2N566	G	P	2N651	2N650	S	0.12	A	25	0		30					
2N567	G	P	2N651	2N650	S	0.15	A	25	0		50					
2N568	G	P	2N651	2N650	S	0.12	A	25	0		50					

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No.	PACKAGE Case No.
2N569	G	P	2N1193	2N1191	S	0.15	A	20	0		70						
2N570	G	P	2N1192	2N1191	S	0.12	A	20	0		70						
2N571	G	P	2N1193	2N1191	S	0.15	A	10	0		100						
2N572	G	P	2N1193	2N1191	S	0.12	A	10	0		100						
2N573	G	P			A	0.2	A	25	0	0.25	30	50 m				5/	
2N574	G	P	2N3316	2N3311	SP	180	C	55	0	10	9.0	10 A					
2N574A	G	P	2N1551	2N1539	SP	180	C	60	0	10	9.0	10 A					
2N575	G	P	2N2153	2N2152	SP	180	C	50	0	25	19	10 A					
2N575A	G	P	2N2154	2N2152	SP	180	C	55	0	25	19	10 A					
2N576	G	N			S	0.2	A	20	R	0.4	20	400 m	1.6 B				
2N576A	G	N			S	0.2	A	20	R		20	400 m	4.0 B				
2N577	G	P			AL	0.025	A	25	B								
2N578	G	P			S	0.12	A	20	B	0.4	10	400 m	2.4 B		900/600		
2N579	G	P			S	0.12	A	20	B	0.4	20	400 m	4.0 B		400/500		
2N580	G	P			S	0.12	A	20	B	0.4	30	400 m	8.0 B		200/400		
2N581	G	P			S	0.08	A	18	B	0.1	20	20 m	3.2 B				
2N582	G	P			S	0.12	A	25	B	0.1	40	20 m	11.2 B				
2N583	G	P			S	0.08	A	18	B	0.1	20	20 m	3.2 B				
2N584	G	P			S	0.12	A	25	B	0.1	40	20 m	11.2 B				
2N585	G	P			S	0.12	A	25	B	0.2	20	20 m	2.4 B				
2N586	G	P	2N1191	2N1191	S	0.25	A	45	B		35	250 m					
2N587	G	N			S	0.15	A	20	R	0.2	20	200 m					
2N588	G	P	2N3324	2N3323	AH	0.03	A	15	S	0.05			200 M			30/	
2N588A	G	P			AH	0.06	A	15	S	0.05	30	10 m	200 M			1/	
2N589	G	P	2N1532	2N1529	AP	90	C	75	S		20	3.0 A	0.1 E				
2N591	G	P	2N1192	2N1191	A	0.05	A	32	0								
2N592	G	P			S	0.125	A	20	0		20						
2N593	G	P			S	0.125	A	30	0		30						
2N594	G	N			S	0.1	A	20	0		20		30 E				
2N595	G	N			S	0.1	A	15	0		35		105 E				
2N596	G	N			S	0.1	A	10	0		50		250 E				
2N597	G	P	2N3427	2N3427	S	0.25	A	40	S	0.5	40	100 m	2.4 B	20		5/	
2N598	G	P	2N3427	2N3427	S	0.25	A	35	S	0.5	70	100 m	5.6 T	20		5/	
2N599	G	P	2N3428	2N3427	S	0.25	A	20	S	0.4	100	100 m	10 T			9/	
2N600	G	P	2N3427	2N3427	SP	0.75	C	35	S	0.4	70	100 m	5.6 T				
2N601	G	P	2N3428	2N3427	SP	0.75	C	20	S	0.4	100	100 m	10 T			31/	
2N602	G	P			SH	0.12	A	20	0		20		10 T				
2N603	G	P			SH	0.12	A	20	0		30		30 T				
2N604	G	P			SH	0.12	A	20	0		40		50 T				
2N605	G	P			AH	0.12	A	15	0								
2N606	G	P			AH	0.12	A	15	0								
2N607	G	P			AH	0.12	A	15	0								
2N608	G	P			AH	0.12	A	15	0								
2N609	G	P	2N1193	2N1191	A	0.18	A	15	0	0.2							
2N610	G	P	2N1193	2N1191	A	0.18	A	15	0	0.2							
2N611	G	P	2N1192	2N1191	A	0.18	A	15	0	0.2							
2N612	G	P	2N1191	2N1191	A	0.18	A	15	0	0.15							
2N613	G	P	2N1191	2N1191	A	0.18	A	15	0	0.2							
2N614	G	P			AH	0.18	A	15	0	0.15						9/	
2N615	G	P			AH	0.18	A	15	0	0.15						9/	
2N616	G	P			AH	0.18	A	12	0	0.15						9/	
2N617	G	P			AH	0.18	A	12	0	0.15						9/	
★2N618	G	P		2N375	AP	90	C	60	S	3.0	60	1.0 A	0.3 E			3/	
2N619	S	N			A	0.175	A	40	0	0.05	9.0	5.0 m	0.16 B	22		5/	
2N620	S	N			A	0.175	A	35	0	0.05	18	5.0 m	0.2 B	22		5/	
2N621	S	N			A	0.175	A	30	0	0.05	36	5.0 m	0.24 B	22		5/	
2N622	S	N			AM	0.385	A	30	0	0.05			0.24 B	70			
2N624	G	P			AH	0.1	A	20	S				20 E				
2N625	G	N			S	1.5	C	30	S		20	500 m					
2N626	G	P															
2N627	G	P			AP	90	C	30	S	10	10	10 A	0.05 E			41/	
2N628	G	P			AP	90	C	45	S	10	10	10 A	0.05 E			41/	
2N629	G	P			AP	90	C	60	S	10	10	10 A	0.05 E			41/	
2N630	G	P			AP	90	C	75	S	10	10	10 A	0.05 E			41/	
2N631	G	P	2N1194	2N1191	A	0.167	A	20	R	0.1							
2N632	G	P	2N1193	2N1191	A	0.167	A	20	R	0.1							
2N633	G	P	2N1192	2N1191	A	0.167	A	30	R	0.1							
2N634	G	N			SH	0.15	A	15	0	0.3	15	200 m	6.4 B			9/	
2N634A	G	N			S	0.15	A	20	R	0.3	40	10 m	6.4 B	20		5/	
2N635	G	N			SH	0.15	A	15	0	0.3	25	200 m	9.6 B			9/	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N635A	G	N			S	0.15	A	20	R	0.3	80	10 m	10 B	20		5/
2N636	G	N			SH	0.15	A	15	0	0.3	35	200 m	14 B			
2N636A	G	N			S	0.15	A	15	R	0.3	100	10 m	14 B	20		5/
2N637	G	P			SP	60	C	35	R	5.0	30	3.0 A				
2N637A	G	P			SP	60	C	65	R	5.0	30	3.0 A				
2N637B	G	P			SP	60	C	75	R	5.0	30	3.0 A				
2N638	G	P			SP	60	C	35	R		20	3.0 A				
2N638A	G	P			SP	60	C	65	R		20	3.0 A				
2N638B	G	P			SP	60	C	75	R		20	3.0 A				
2N639	G	P			SP	37	C	35	R		15	3.0 A				
2N639A	G	P			SP	37	C	65	R		15	3.0 A				
2N639B	G	P			SP	37	C	75	R		15	3.0 A				
2N640	G	P			A	0.08	A	34	B	0.01						7/
2N641	G	P			A	0.08	A	34	B	0.01						7/
2N642	G	P			A	0.08	A	34	B	0.01						7/
2N643	G	P	2N2955	2N2955	S	0.12	A	30	B	0.1	20	10 m	20 T	5.0		9/
2N644	G	P	2N2955	2N2955	S	0.12	A	30	B	0.1	20	10 m	20 T	5.0		9/
2N645	G	P	2N2955	2N2955	S	0.12	A	30	B	0.1	20	10 m	20 T	5.0		9/
2N646	G	N			A	0.1	A	25	0	0.05	50	30 m				40/
2N647	G	N			A	0.1	A	25	0	0.05						1/
2N649	G	N			A	0.1	A	18	0	0.05						1/
★2N650	G	P		2N650	A	0.2	A	30	R	0.5	30	10 m	0.6 B	25		5/31
★2N650A	G	P		2N650	A	0.2	A	30	R	0.5	33	10 m	0.6 B	25		5/31
★2N651	G	P		2N650	A	0.2	A	30	R	0.5	45	10 m	0.8 B	25		5/31
★2N651A	G	P		2N650	A	0.2	A	30	R	0.5	45	10 m	0.8 B	25		5/31
★2N652	G	P		2N650	A	0.2	A	30	R	0.5	80	10 m	1.0 B	25		5/31
★2N652A	G	P		2N650	A	0.2	A	30	R	0.5	80	10 m	1.0 B	25		5/31
★2N653	G	P		2N653	A	0.2	A	25	R	0.25	20	10 m				5/31
★2N654	G	P		2N653	A	0.2	A	25	R	0.25	40	10 m				5/31
★2N655	G	P		2N653	A	0.2	A	25	R	0.25	70	10 m				5/31
★2N656	S	N	2N4238	2N4237	A	4.0	C	60	0		30	200 m				5/31
2N656A	S	N	2N4238	2N4237	A	5.0	C	60	0	0.5	30	200 m				5/
★2N657	S	N	2N5681	2N5681	A	4.0	C	100	0		30	200 m				5/31
2N657A	S	N	2N5681	2N5681	A	5.0	C	100	0	0.5	30	200 m				5/
2N658	G	P			S	0.167	A	16	0		25		2.0 B			
2N659	G	P			S	0.167	A	14	0	1.0	40		4.0 B	20		
2N660	G	P			S	0.167	A	11	0	1.0	60		8.0 B			
2N661	G	P			S	0.167	A	9.0	0	1.0	80		12.0 B	20		
2N662	G	P			S	0.167	A	11	0	1.0	30		3.2 B	20		
2N663	G	P			SP	35	C	25	0	4.0	25	500 m	0.375 E			
★2N665	G	P		2N665	SP	35	C	40	0	3.0	40	500 m	0.4 E			3/
★2N669	G	P		2N176	AP	62.5	C	30	S	3.0	75	0.5 A	0.375 E			3/
2N670	G	P	2N3428	2N3427	A	0.3	A	40	V	2.0	40	1.0 A	0.4 B			
2N671	G	P	2N3428	2N3427	A	0.8	C	40	V	2.0	40	1.0 A	0.4 B			
2N672	G	P	2N3428	2N3427	A	0.3	A	25	S	2.0						
2N673	G	P	2N3428	2N3427	A	0.8	C	25	S	2.0						
2N674	G	P	2N3428	2N3427	A	0.3	A	75	V	2.0	40	1.0 A	0.32 B			
2N675	G	P	2N3428	2N3427	A	0.8	C	75	V	2.0	40	1.0 A	0.32 B			26/
2N677	G	P			AP	90	C	30	S	15	20	10 A				3/
2N677A	G	P			AP	90	C	40	S	15	20	10 A				3/
2N677B	G	P			AP	90	C	70	S	15	20	10 A				3/
2N677C	G	P			AP	90	C	80	S	15	20	10 A				3/
2N678	G	P			AP	90	C	20	0	15	50	10 A				41/
2N678A	G	P			AP	90	C	30	0	15	50	10 A				41/
2N678B	G	P			AP	90	C	60	0	15	50	10 A				41/
2N678C	G	P			AP	90	C	70	0	15	50	10 A				41/
2N678.	G	N			S	0.15	A	20	X		20	30 m	1.6 B			
2N680	G	P	2N1191	2N1191	A	0.15	A	20	S	0.15	18	50 m				
2N681				TABLE7	THY											
2N692				TABLE7	THY											
2N694	G	P			AH	0.1	A	15	0	0.05	10	2.0 m	340 T	2.5		
2N695	G	P	2N705	2N705	SH	0.075	A	15	S	0.05	25	10 m			75/200	
★2N696	S	N		2N696	S	0.6	A	40	R		20	150 m	40 T	35		
2N696A	S	N	2N2218	2N2218	S	0.8	A	35	0	1.0	20	150 m	40 T	35		5/31
★2N697	S	N		2N696	S	0.6	A	40	R		40	150 m	40 T	35		5/31
2N697A	S	N	2N2218	2N2218	S	0.8	A	35	0	1.0	40	150 m	50 T	35		5/31
2N698	S	N	2N3498	2N3498	S	0.8	A	80	R		20	150 m	40 T	15		5/
★2N699	S	N		2N699	S	2.0	C	80	R		40	150 m	50 T	20		5/
2N699A	S	N	2N3498	2N3498	S	2.0	C	80	R		40	150 m	50 T	20		39/79

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N699B	S	N	2N3498	2N3498	S	0.87	A	100	R		40	150 m	60 T	15		5/
2N700	G	P		2N700	AH	0.075	A	20	0	0.05	1.5	2.0 m	500 T	1.5		17/
2N700A	G	P		2N700	AH	0.075	A	25	0	0.05	1.5	2.0 m	1000 T	1.4		17/
★2N702	S	N		2N702	SH	0.3	A	25	0	0.05	20	10 m	70 T	6.0		
★2N703	S	N		2N702	SH	0.3	A	25	0		40	10 m	70 T	6.0		18/22
★2N705	G	P		2N705	SH	0.3	C	15	S	0.05	25	10 m			75/200	18/22
2N705A	G	P			SH	0.15	A	15	S	0.1	25	10 m		8.0		
★2N706	S	N		2N706	SH	0.3	A	20	R		20	10 m	200 T	6.0	40/75	18/22
2N706A	S	N		2N706	SH	0.3	A	20	R	0.05	20	10 m	200 T	5.0	40/75	18/22
★2N706B	S	N		2N706	SH	0.3	A	15	0	0.05	20	10 m	200 T	5.0	40/75	18/22
2N706C	S	N	2N835	2N834	SH	0.36	A	20	R	0.05	20	10 m	200 T	5.0	40/75	18/
★2N707	S	N		2N707	AHP	1.0	C	28	R	0.1	9.0	10 m	70 T	10		18/
★2N707A	S	N		2N707	AH	1.2	C	40	0	0.1	9.0	10 m	70 T	6.0		18/
★2N708	S	N		2N708	SH	0.36	A	20	R		30	10 m	300 T	6.0		18/22
2N708A	S	N	2N834	2N834	SH	0.36	A	30	R		40	10 m	300 T			18/
2N709	S	N			SH	0.3	A	6.0	0		20	10 m	600 T			18/
2N709A	S	N			SH	0.3	A	6.0	0		30	10 m	800 T	3.0	15/15	18/
2N710	G	P	2N705	2N705	SH	0.3	C	15	S	0.05	25	10 *				
2N710A	G	P			SH	0.15	A	15	S	0.05	25	10 m		8.0	75/125	18/
★2N711	G	P		2N711	SH	0.15	A	12	S	0.05	20	10 m	150 T			18/22
★2N711A	G	P		2N711	SH	0.15	A	7.0	0	0.1	25	10 m	150 T	6.0	200/150	18/22
★2N711B	G	P		2N711	SH	0.15	A	7.0	0	0.1	30	10 m	150 T	6.0	100/240	18/22
2N715	S	N	2N2221	2N2218	AH	0.5	A	35	0	0.1	10	15 m	700 E	6.0		18/
2N716	S	N	2N2221	2N2218	AH	0.5	A	40	0		10	15 m	700 E			
2N717	S	N	2N2221	2N2218	AH	0.4	A	40	R		20	150 m	40 T	35		18/
★2N718	S	N		2N718	AH	0.4	A	40	R		40	150 m	50 T	35		18/22
★2N718A	S	N		2N718A	AH	0.5	A	50	R		40	150 m	60 T	25		18/22
2N719	S	N	2N3498	2N3498	AH	0.4	A	80	R		20	150 m	40 T	85		18/
2N719A	S	N	2N3498	2N3498	AH	0.5	A	80	R	1.0	20	150 m	40 T	15		18/
2N720	S	N	2N3498	2N3498	AH	0.4	A	80	R		40	150 m	50 T	85		18/
★2N720A	S	N		2N720A	S	0.5	A	100	R		40	150 m	50 T	15		18/22
2N721	S	P			AH	0.4	A	50	R		20	150 m	50 T	45		18/
2N721A	S	P	2N2905	2N2904	AH	0.5	A	50	R		20	150 m	50 T	40		18/
2N722	S	P		2N722	AH	0.4	A	50	R		30	150 m	60 T	45		18/
2N722A	S	P	2N2837	2N2800	AH	0.5	A	50	R		30	150 m	60 T			
2N725	G	P			SH	0.15	A	12	S	0.05	20	10 m				18/
2N726	S	P	2N727	2N727	A	0.3	A	20	0	0.05	15	10 m	140 T	5.0		18/22
★2N727	S	P		2N727	A	0.3	A	20	0	0.05	30	10 m	140 T	5.0		18/
2N728	S	N	2N2539	2N2537	SH	0.4	A	15	0	0.1	20	10 m	100 T	12		18/
2N729	S	N	2N2539	2N2537	SH	0.4	A	30	0	0.1	20	10 m	100 T	12		18/
2N730	S	N	2N2218	2N2218	A	0.5	A	40	R	1.0	20	150 m	40 T	35		18/
★2N731	S	N		2N731	A	0.5	A	40	R	1.0	40	150 m	25 T	35		18/
2N734	S	N	2N2221	2N2218	A	0.5	A	60	0	0.05	15	5.0 m		10		18/
2N734A	S	N	2N2218A	2N2218	A	0.5	A	60	0	0.05	15	5.0 m	30 T	6.0		18/
★2N735	S	N		2N735	A	0.5	A	60	0	0.05	30	5.0 m		10		18/
2N735A	S	N	2N2218A	2N2218	A	0.5	A	60	0	0.05	30	5.0 m	60 T	6.0		
★2N736	S	N	2N2222	2N735	A	0.5	A	60	0	0.05	60	5.0 m		10		18/
2N736A	S	N	2N2222	2N2218	A	0.5	A	60	0	0.1	60	5.0 m	100 T			18/
2N736B	S	N	2N2896	2N2895	A	0.5	A	60	0	0.1	60	5.0 m	100 T	6.0		18/
2N738	S	N	2N2896	2N2895	A	0.5	A	80	0	0.05	15	5.0 m				18/
2N738A	S	N	2N2896	2N2895	A	0.5	A	80	0	0.05	15	5.0 m	30 T	6.0		18/
★2N739	S	N		2N735	A	0.5	A	80	0	0.05	30	5.0 m		10		18/
2N739A	S	N	2N2896	2N2895	A	0.5	A	80	0	0.05	30	5.0 m	60 T	6.0		18/
★2N740	S	N		2N735	A	0.5	A	80	0	0.05	60	5.0 m		10		
2N740A	S	N	2N2896	2N2895	A	0.5	A	80	0	0.05	60	5.0 m	100 T	6.0		18/
★2N741	G	P		2N741	AH	0.15	A	15	S	0.1	10	5.0 m		10		18/
★2N741A	G	P		2N741	AH	0.15	A	20	S	0.1	10	5.0 m	300 T	10		18/
2N742	S	N	2N2218	2N2218	S	0.5	A	60	0	0.1	25	10 m		8.0	50/250	18/
2N742A	S	N	2N2218	2N2218	S	0.5	A	60	0	0.1	25	10 m		8.0	50/250	18/
★2N743	S	N		2N743	SH	0.3	A	12	0	0.2	20	10 m	200 T	5.0	16/24	18/
2N743A	S	N	2N2369	2N2369	SH	0.36	A	15	0	0.2	20	10 m	500 T	4.0		18/
★2N744	S	N		2N744	SH	0.3	A	12	0	0.2	40	10 m	300 T	5.0	16/24	18/
2N744A	S	N	2N2369	2N2369	SH	0.36	A	15	0	0.2	40	10 m	500 T	4.0		18/
2N745	S	N	2N2221	2N2218	A	0.15	A	30	0	0.02	20	10 m	8.0 T	3.0	350/400	
2N746	S	N	2N2221	2N2218	A	0.15	A	30	0	0.02	45	10 m	8.0 T		350/700	
2N747	S	N	2N2221	2N2218	S	0.2	A	25	0	0.05	30	10 m		8.0		
2N748	S	N	2N2221	2N2218	S	0.2	A	30	0	0.05	20	10 m		8.0		
2N749	S	N	2N2221	2N2218	AH	0.2	A	25	0	0.05	15	10 m	40 T	10		
2N751	S	N	2N2221	2N2218	AH	0.2	A	20	0	0.05	30	10 m	16 T	10		
2N752	S	N	2N2221	2N2218	AH	0.5	A	45	0	0.1			200 T	5.0		18/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No.	Case No.
★2N753	S	N		2N706	SH	0.3	A	20	R	0.05	40	10 m	200 T	5.0	40/75	18/	
2N754	S	N		2N3019	AH	0.3	A	60	R	0.05	20	5.0 m	30 T	10		18/	
2N755	S	N		2N3019	AH	0.3	A	80	R	0.05	20	5.0 m	30 T	10		18/	
2N756	S	N	2N2218	2N2218	A	0.5	A	45	0	0.1			40 B	8.0		18/	
2N756A	S	N		2N3019	A	0.5	A	60	0	0.1			40 B			18/	
2N757	S	N	2N2218	2N2218	A	0.5	A	45	0	0.1			40 B	8.0		18/	
2N757A	S	N		2N3019	A	0.5	A	60	0	0.1			40 B			18/	
2N758	S	N	2N2218	2N2218	A	0.5	A	45	0	0.1			40 B	8.0		18/	
2N758A	S	N		2N3019	A	0.5	A	60	0	0.1			40 B			18/	
2N758B	S	N		2N3019	A	0.5	A	60	0	0.1	12	1.0 m	40 B	6.0		18/	
2N759	S	N	2N2218	2N2218	A	0.5	A	45	0	0.1			40 B	8.0		18/	
2N759A	S	N	2N3019	2N3019	A	0.5	A	60	0	0.1			40 B			18/	
2N759B	S	N	2N3019	2N3019	A	0.5	A	60	0	0.1	25	1.0 m	40 B	6.0		18/	
2N760	S	N	2N2218	2N2218	A	0.5	A	45	0	0.1			40 B	8.0		18/	
2N760A	S	N	2N3019	2N3019	A	0.5	A	60	0	0.1			40 B			18/	
2N760B	S	N	2N3019	2N3019	A	0.5	A	60	0	0.1	50	1.0 m	40 B	60		18/	
2N761	S	N	2N2218A	2N2218	A	0.5	A	30	0	0.1	20	10 m	40 B	6.0		18/	
2N762	S	N	2N2218A	2N2218	A	0.5	A	30	0	0.1	45	10 m	40 B	6.0		18/	
2N764				TABLE7	THY												
THRU																	
2N767				TABLE7	THY												
2N768	G	P	2N961	2N956	SH	0.035	A	10	S	0.1	25	2.0 m	125 T			18/	
2N769	G	P	2N961	2N956	SH	0.035	A	7.0	0	0.1	25	20 m	100 T	3.0		18/	
2N770	S	N	2N3014	2N3013	SH	0.15	A	15	0	0.1	12	20 m	75 T	3.5		18/	
2N771	S	N	2N3014	2N3013	SH	0.15	A	15	0	0.1	30	20 m	100 T	3.5		18/	
2N772	S	N	2N3014	2N3013	SH	0.15	A	25	0	0.1	20	10 m	75 T	3.5		18/	
2N773	S	N	2N3014	2N3013	AH	0.15	A	15	0	0.1	4.0	1.5 m				18/	
2N774	S	N	2N3014	2N3013	AH	0.15	A	15	0	0.1	7.0	1.5 m				18/	
2N775	S	N	2N3014	2N3013	AH	0.15	A	15	0	0.1	20	1.5 m				18/	
2N776	S	N	2N3014	2N3013	AH	0.15	A	15	0	0.1	4.0	1.5 m				18/	
2N777	S	N	2N3014	2N3013	AH	0.15	A	15	0	0.1	7.0	1.5 m				18/	
2N778	S	N	2N3014	2N3013	AH	0.15	A	15	0	0.1	20	1.5 m				18/	
2N779	G	P	2N964	2N960	SH	0.06	A	15	S	0.05	50	10 m	320 T	2.5		18/	
2N779A	G	P	2N964	2N960	SH	0.06	A	15	S	0.1	50	10 m	320 T	2.5		18/	
2N779B	G	P	2N964	2N960	SH	0.15	A	15	S		50	10 m	320 T	2.5		18/	
2N780	S	N	2N2220		A	1.0	C	45	0	0.05	35		60 T	4.0		18/	
2N781	G	P			SH	0.15	A	15	S		25	10 m					
2N782	G	P			SH	0.15	A	12	S		20	10 m					
2N783	S	N	2N834	2N834	SH	0.3	A	20	R		20	10 m	200 T				
2N784	S	N	2N834	2N834	SH	0.3	A	15	R	0.2	25	10 m	200 T	3.5		18/	
2N784A	S	N	2N834	2N834	SH	0.35	A	20	R		25	10 m	300 T				
2N785	G	P			A	0.05	A	12	S	0.02						23/	
2N789	S	N	2N3946	2N3946	A	015	A	30	0	0.25			0.8 B	10			
2N790	S	N	2N3946	2N3946	A	0.15	A	30	0	0.25			1.6 B	10			
2N791	S	N	2N3946	2N3946	A	0.15	A	30	0	0.25			6.4 B	10			
2N792	S	N	2N3946	2N3946	A	0.15	A	30	0	0.25			1.6 B	10			
2N793	S	N	2N3946	2N3946	A	0.15	A	30	0	0.25			1.6 B	10			
2N794	G	P			SH	0.12	A			0.1	30	10 m	25 T	12			
2N795	G	P			SH	0.12	A			0.1	30	10 m	35 T	12			
2N796	G	P			SH	0.12	A			0.1	50	10 m	50 T	12		18/	
2N797	G	N			SH	0.15	A	7.0	0	0.15	40	10 m	600 T	4.0	40/80	18/	
2N799	G	P			S	0.075	A	12	0	0.1	30	12 m	3.2 B	20		18/	
2N800	G	P			S	0.075	A	12	0	0.1	30		3.2 B	20			
2N801	G	P			S	0.075	A	18	0	0.4	30			20	1000/610		
2N802	G	P			S	0.075	A	18	0	0.4	30			20	1000/610		
2N803	G	P			S	0.075	A	15	0	0.4	40			20	810/610		
2N804	G	P			S	0.075	A	15	0	0.4	40			20	810/610		
2N805	G	P			S	0.075	A	12	0	0.4	60			20	810/560		
2N806	G	P			S	0.075	A	12	0	0.4	60			20	810/560		
2N807	G	P			S	0.07	A	14	V	0.1	40	20 m	11.2 B				
2N808	G	P			S	0.07	A	14	V	0.1	40	20 m	11.2 B				
2N809	G	P			AH	0.075	A	15	0	0.2	25	25 m	2.4 B	20			
2N810	G	P			AH	0.075	A	15	0	0.2	25	25 m	2.4 B	20			
2N811	G	P			AH	0.075	A	12	0	0.2	45	45 m	4.0 B	20			
2N812	G	P			AH	0.075	A	12	0	0.2	45	45 m	4.0 B	20			
2N813	G	P			AH	0.075	A	10	0	0.2	55	55 m	12 B	20			
2N814	G	P			AH	0.075	A	10	0	0.2	55	55 m	12 B	20			
2N815	G	N			S	0.075	A	15	0	0.2	60	30 m		20	1000/1400		
2N816	G	N			S	0.075	A	15	0	0.2	60	30 m		20	1000/1400		
2N817	G	N			S	0.075	A	15	0	0.4	20	50 m		20	1000/610		

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N818	G	N			S	0.075	A	15	0	0.4	20	50 m		20	1000/610	
2N819	G	N			S	0.075	A	20	0	0.4	30	50 m		20	800/610	
2N820	G	N			S	0.075	A	20	0	0.4	30	50 m		20	800/610	
2N821	G	N			S	0.075	A	25	0	0.4	40	50 m		20	810/560	
2N822	G	N			S	0.075	A	25	0	0.4	40	50 m		20	810/560	
2N823	G	N			S	0.075	A	12	0	0.1	40	20 m	3.2 B	20		
2N824	G	P			AH	0.070	A	18	0	0.2			1.6 B	18		
2N825	G	P			S	0.070	A	20	0	0.4	40		2.0 B	20	1000/1100	
2N826	G	P			S	0.070	A	20	0	0.4	20		2.0 B	20		
★2N827	G	P		2N827	SH	0.15	A	20	S	0.1	100	10 m	250 T	9.0		18/22
★2N828	G	P		2N828	SH	0.15	A	15	S	0.2	25	10 m	300 T			18/22
★2N828A	G	P		2N828A	SH	0.15	A	15	S	0.2	25	10 m	300 T	4.0	-/100	18/22
★2N829	G	P		2N828A	SH	0.15	A	15	S	0.2	50	10 m	300 T	4.0	/100	18/22
★2N834	S	N		2N834	SH	0.3	A	30	S	0.2	25	10 m	350 T	4.0	33/75	18/22
2N834A	S	N			SH	0.36	A	30	S	0.2	25	10 m	500 T	4.0	16/34	
★2N835	S	N		2N834	SH	0.3	A	20	0	0.2	20	10 m	300 T	4.0	20/35	18/22
2N837	G	P			SH	0.15	A	12	S	0.1	30	10 m		9.0	30/90	18/
★2N838	G	P		2N838	SH	0.15	A	30	S	0.1	30	10 m	300 T	4.0	15/25	18/22
2N839	S	N	2N2222	2N2218	AH	0.3	A	45	0	0.05	15	10 m	30 T	15		
2N840	S	N		2N840	AH	0.3	A	45	0	0.05	30	10 m	30 T	15		18/
★2N841	S	N		2N840	AH	0.3	A	45	0	0.05	60	10 m	40 T	15		18/22
2N842	S	N	2N2221	2N2218	AH	0.3	A	45	0	0.05	20	10 m	30 T	10		18/
2N843	S	N	2N2222	2N2218	AH	0.3	A	45	0	0.05	45	10 m	40 T	10		18/
2N844	S	N	2N2896	2N2895	AH	0.3	A	60	R	0.05	40	5.0 m	50 T	10		18/
2N845	S	N	2N2896	2N2895	AH	0.3	A	80	R	0.05	40	5.0 m	50 T	10		18/
2N846	G	P	2N960	2N960	SH	0.06	A	15	S	0.1	25	10 m	320 T	2.5		18/
2N846A	G	P	2N960	2N960	SH	0.06	A	15	S	0.1	25	10 m	320 T	2.5		
2N846B	G	P	2N960	2N960	SH	0.15	A	15	S	0.1	25	10 m	320 T	2.5		18/
2N847	S	N	2N835	2N834	S	0.2	A	15	0	0.05					32/58	
2N848	S	N	2N834	2N834	S	0.2	A	25	0	0.05					32/58	
2N849	S	N	2N835	2N834	SH	0.3	A	15	0	0.05	20	10 m	600 T	5.0	40/75	
2N850	S	N	2N834	2N834	SH	0.3	A	15	0	0.05	40	10 m	600 T	5.0	40/75	
2N851	S	N	2N835	2N834	SH	0.3	A	12	0	0.2	20	10 m	300 T			
2N852	S	N	2N834	2N834	SH	0.3	A	12	0	0.2	40	10 m	300 T			
2N858	S	P	2N2906	2N2904	S	0.15	A	40	0	0.05	10	5.0 m	5.0 T	12	300/450	18/
2N859	S	P	2N2906	2N2904	S	0.15	A	40	0	0.05	25	5.0 m	6.0 T	9.0	250/500	18/
2N860	S	P	2N2906	2N2904	S	0.15	A	25	0	0.05	10	5.0 m	6.5 T	9.0	230/380	18/
2N861	S	P	2N2906	2N2904	S	0.15	A	25	0	0.05	25	5.0 m	7.5 T	9.0	210/360	18/
2N862	S	P	2N2906	2N2904	S	0.15	A	15	0	0.05	12	5.0 m	8.0 T	9.0	200/350	18/
2N863	S	P	2N2906	2N2904	S	0.15	A	15	0	0.05	25	5.0 m	10 T	9.0	175/325	18/
2N864	S	P	2N2906	2N2904	S	0.15	A	6.0	0	0.05	20	5.0 m	16 T	9.0	150/300	18/
2N864A	S	P	2N2906	2N2904	S	0.3	A	6.0	0	0.1	20	5.0 m	16 T	9.0	150/300	18/
2N865	S	P	2N2906	2N2904	S	0.15	A	6.0	0	0.05	45	5.0 m	24 T		100/250	18/
2N865A	S	P	2N2906	2N2904	S	0.3	A	10	0	0.1	45	5.0 m	24 T	9.0	100/250	18/
2N866	S	N	2N2906	2N2904	S	0.5	A	20	R	0.6	15	150 m	40 T	45	-/150	18/
2N867	S	N	2N2906	2N2904	S	0.5	A	20	R	0.6	30	150 m	50 T	45	-/150	18/22
★2N869	S	P		2N869	AH	0.36	A	18	0		20	10 m	100 T	9.0		18/22
★2N869A	S	P		2N869A	S	0.36	A	18	0	0.2	40	30 m	400 T	6.0	50/80	18/
2N870	S	N			AH	0.5	A	80	R		40	150 m	50 T	15		18/
2N871	S	N	2N2895	2N2895	AH	0.5	A	80	R		100	150 m	60 T	15		
2N876				TABLE7	THY											
THRU																
2N901				TABLE7	THY											
2N902	S	N	2N2221	2N2218	A	0.15	A	30	0	0.25			1.0 T	30		
2N903	S	N	2N2221	2N2218	A	0.15	A	30	0	0.25			2.0 T	10		
2N904	S	N	2N2221	2N2218	A	0.15	A	30	0	0.25			8.0 T	10		
2N905	S	N	2N2221	2N2218	A	0.15	A	30	0	0.25			2.0 T	10		
2N906	S	N	2N2221	2N2218	A	0.15	A	30	0	0.25			2.0 T	10		
2N907	S	N	2N2221	2N2218	A	0.15	A	30	0	0.02	20	10 m	12 T	3.0	350/400	
2N908	S	N	2N2221	2N2218	A	0.15	A	30	0	0.02	45	10 m	25 T	3.0	350/700	
2N909	S	N	2N2222	2N2218	A	0.4	A	30	R		110	50 m	50 T	35		18/
★2N910	S	N		2N910	A	0.5	A	80	R	1.0	75	10 m	60 T	15		18/22
2N911	S	N		2N910	A	0.5	A	80	R		35	10 m	50 T			18/
2N912	S	N	2N2895	2N2895	A	0.5	A	80	R		15	10 m	40 T	15		18/
★2N914	S	N		2N914	SH	0.36	A	20	R	0.15	30	10 m	300 T	6.0	40/40	18/22
2N914A	S	N	2N2369	2N2369	SH	0.36	A	20	R		30	10 m	300 T			18/
★2N915	S	N		2N915	AH	0.36	A	50	0		50	10 m	250 T	3.5		18/22
2N915A	S	N			AHP	1.2	C	50	0		50	5.0 m	600 T			18/
★2N916	S	N		2N916	AH	0.36	A	25	0		50	10 m	300 T	6.0		18/22
2N916A	S	N	2N918	2N918	AH	0.36	A	25	0		50	10 m	300 T			

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N916B	S	N			AHP	1.2	C	30	0		50	10 m	500 T	3.0		18/
2N917	S	N	2N918	2N918	AH	0.2	A	15	0		20	3.0 m	500 T	1.7		
2N917A	S	N	2N918	2N918	AH	0.2	A	15	0		20	3.0 m	600 T	3.0		
★2N918	S	N		2N918	AH	0.2	A	15	0	0.05	20	3.0 m	600 T	1.7		72/20
2N919	S	N	2N834	2N834	SH	0.36	A	15	0	0.22	20	10 m	200 T	7.0		18/
2N920	S	N	2N834	2N834	SH	0.36	A	15	0	0.22	40	10 m	200 T	7.0		18/
2N921	S	N	2N834	2N834	SH	0.36	A	20	0	0.2	20	10 m	200 T	5.0		18/
2N922	S	N	2N834	2N834	SH	0.36	A	20	0	0.2	40	10 m	200 T	5.0		18/
2N923	S	P	2N2906	2N2904	A	0.25	A	25	0	0.05			0.64 B	20		18/
2N924	S	P	2N2906	2N2904	A	0.25	A	25	0	0.05			0.64 B	20		18/
2N925	S	P	2N2906	2N2904	A	0.25	A	40	0	0.05			0.64 B	20		18/
2N926	S	P	2N2906	2N2904	A	0.25	A	40	0	0.05			0.64 B	20		18/
2N927	S	P	2N2906	2N2904	A	0.25	A	60	0	0.05			0.64 B	20		18/
2N928	S	P	2N2906	2N2904	A	0.25	A	60	0	0.05			0.64 B	20		18/
★2N929	S	N		2N929	A	1.8	C	45	0	0.03	40	10 *	30 T	8.0		18/22
★2N929A	S	N		2N929	A	1.8	C	45	0	0.03	40	10 *	45 T	6.0		18/22
★2N930	S	N		2N929	A	1.8	C	45	0	0.03	100	10 *	30 T	8.0		18/22
★2N930A	S	N		2N929	A	1.8	C	45	0	0.03	100	10 *	45 T	6.0		18/
2N930B	S	N	2N930A	2N929	A	1.8	C	45	0	0.03	100	10 *	45 T			18/
2N934	G	P	2N965	2N960	SH	0.15	A	12	0	0.2	40	40 m	35 T	12		18/
2N935	S	P	2N2907A	2N2904	A	0.25	A	40	0	0.05	9.0					18/
2N936	S	P	2N2907A	2N2904	A	0.25	A	35	0	0.05	18					18/
2N937	S	P	2N2907A	2N2904	A	0.25	A	30	0	0.05	36					18/
2N938	S	P	2N2907A	2N2904	A	0.25	A	35	0	0.1			0.8 B			18/
2N939	S	P	2N2907A	2N2904	A	0.25	A	35	0	0.1			1.6 B			18/
2N940	S	P	2N2907A	2N2904	A	0.25	A	35	0	0.1			1.6 B			18/
2N941	S	P	2N2907A	2N2904	SC	0.25	A	8	U	0.05	10	1.0 m	16 T	14		18/
2N942	S	P	2N2907A	2N2904	SC	0.25	A	8	U	0.05	10	1.0 m	10 T	14		18/
2N943	S	P	2N2907A	2N2904	SC	0.25	A	18	0	0.05	10		0.8 B	14		18/
2N944	S	P	2N2907A	2N2904	SC	0.25	A	18	0	0.05	10		0.8 B	14		18/
2N945	S	P	2N2907A	2N2904	SC	0.25	A	50	0	0.05	10		0.8 B	14		18/
2N946	S	P	2N2907A	2N2904	SC	0.25	A	80	0	0.05	10		0.8 B	14		18/
2N947	S	N	2N834	2N834	S	0.36	A	15	R	0.1	20	10 m	200 T	8.0		18/
2N948				TABLE7	THY											
THRU																
2N951				TABLE7	THY											
2N955	G	N			SH	0.15	A	8.0	0	0.1	30	30 m		6.0		18/
2N955A	G	N			SH	0.15	A	8.0	0	0.1	30	30 m		6.0		18/
★2N956	S	N		2N718A	AH	0.5	A	50	R		100	150 m	70 T	25		18/22
2N957	S	N	2N2501	2N2501	AH	0.25	A	20	0		45	10 m	200 T	6.0		18/
2N958	S	N	2N835	2N834	SH	0.25	C	15	0	0.2	20	10 m	200 T	7.0		51/
2N959	S	N	2N835	2N834	SH	0.25	C	15	0	0.2	40	10 m	200 T	7.0		51/
★2N960	G	P		2N960	SH	0.15	A	15	S	0.1	20	10 m	300 T	4.0	50/85	18/22
★2N961	G	P		2N960	SH	0.15	A	12	S	0.1	20	10 m	300 T	4.0	50/85	18/22
★2N962	G	P		2N960	SH	0.15	A	12	S	0.1	20	10 m	300 T	4.0	50/85	18/22
★2N963	G	P		2N963	SH	0.15	A	12	S	0.1	20	10 m	250 T	5.0	60/120	18/22
★2N964	G	P		2N960	SH	0.15	A	15	S	0.1	40	10 m	300 T	4.0	50/85	18/22
★2N964A	G	P		2N964A	SH	0.15	A	15	S	0.1	40	10 m	300 T	5.0		18/
★2N965	G	P		2N960	SH	0.15	A	12	S	0.1	40	10 m	300 T	4.0	50/85	18/22
★2N966	G	P		2N960	SH	0.15	A	12	S	0.1	40	10 m	300 T	4.0	50/85	18/22
★2N967	G	P		2N963	SH	0.15	A	12	S	0.1	40	10 m	250 T	5.0	60/120	
★2N968	G	P		2N963	SH	0.15	A	15	S	0.2	17	10 m	300 T	9.0	75/150	18/22
★2N969	G	P		2N963	SH	0.15	A	12	S	0.2	17	10 m	300 T	9.0	75/150	18/22
★2N970	G	P		2N963	SH	0.15	A	12	S	0.2	17	10 m	300 T	8.0	100/275	18/22
★2N971	G	P		2N963	SH	0.15	A	7.0	S	0.2	17	10 m	300 T	8.0	275/300	18/22
★2N972	G	P		2N963	SH	0.15	A	15	S	0.2	40	10 m	300 T	8.0	175/175	18/22
★2N973	G	P		2N963	SH	0.15	A	12	S	0.2	40	10 m	300 T	8.0	75/150	18/22
★2N974	G	P		2N963	SH	0.15	A	12	S	0.2	40	10 m	300 T	8.0	75/275	18/22
★2N975	G	P		2N963	SH	0.15	A	7.0	S	0.2	40	10 m	300 T	8.0	75/275	18/22
2N976	G	P	2N964	2N960	SH	0.1	A	10	0	0.1	30	20 m	249 T	0.3		18/
2N977	G	P	2N964	2N960	SH	0.15	A	10	0	0.2	50	40 m	400 T	8.0	10/20	18/
★2N978	S	P		2N978	AH	0.33	A	20	0	0.6	15	150 m	40 T	45		18/22
2N979	G	P			SH	0.06	A	15	0	0.1	30	10 m	100 T	5.0		18/
2N980	G	P			SH	0.06	A	12	0	0.1	30	10 m	100 T	3.0	60/120	18/
2N981	S	N	2N720A	2N720A	A	0.5	A	80	0	0.1	3.6	1.0 m	40 B	5.0		18/
2N982	G	P			SH	0.06	A	15	0	0.1	50	10 m		2.5	18/18	18/
2N983	G	P			SH	0.06	A	15	0	0.1	40	10 m		2.5	18/18	18/
2N984	G	P			SH	0.06	A	10	0	0.1	50	10 m		3.0	20/20	18/
★2N985	G	P		2N985	SH	0.15	A	7.0	0	0.2	40	10 m	300 T	6.0	35/80	18/
2N986	S	N	2N2895	2N2895	AL	0.5	A	80	R							18/22

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N987	G	P			AH	0.1	A	40	0	0.01	40	1.0 m		4.0		
2N988	S	N	2N2221	2N2218	AH	0.3	A	10	0	0.22	20	10 m	300 T	4.0		18/
2N989	S	N	2N2221	2N2218	AH	0.3	A	10	0	0.22	20	10 m	300 T	4.0		18/
2N990	G	P			AH	67	A	20	R	0.01	40	1.0 m	44 T	4.0		18/
2N991	G	P			AH	67	A	20	R	0.01	40	1.0 m	44 T	4.0		
2N992	G	P			AH	0.067	A	20	R	0.01	40	1.0 m				
2N993	G	P			AH	0.067	A	20	R	0.01	40	1.0 m	44 T			
2N994	G	P			SH	0.2	A	6	0	0.15	45	10 m		6.0	35/45	18/
★2N995	S	P		2N869	AH	0.36	A	15	0		35	20 m	100 T	10		18/22
2N995A	S	P	2N3250	2N3250	AH	0.36	A	15	0		35	20 m	100 T	6.0	60/90	18/
2N996	S	P		2N996	AH	0.36	A	12	0		35	20 m	100 T	10		18/
2N997	S	N	2N720A	2N720A	A	0.5	A	40	0	0.3	35	100 *				18/
★2N998	S	N		2N998	AL	0.5	A	60	0	0.5	1600	10 m		30		72/20
2N999	S	N			AL	0.5	A	60	0	0.5				20		
2N1000	G	N			S	0.15	A	25	0		40	10 m	5.6 B	20	700/1000	5/
2N1003	G	P			AH	0.12	A	20	U					5.0		
2N1004	G	P			AH	0.12	A	20	U					5.0		
2N1005	S	N	2N2242	2N2242	A	0.15	A	15	0	0.025	10	10 m				5/
2N1006	S	N	2N2242	2N2242	A	0.15	A	15	0	0.025	25	10 m				5/
2N1007	G	P			AP	35	C	20	0	3.0	50	1.0 A	0.060 T			3/
★2N1008	G	P		2N1008	A	0.3	C	15	R	0.3	40					5/31
★2N1008A	G	P		2N1008	A	0.3	C	35	R	0.3	40					5/31
★2N1008B	G	P		2N1008	A	0.3	C	55	R	0.3	40					5/31
2N1009	G	P			A	0.4	C	35	R							
2N1010	G	N			A	0.02	A	10	0	0.002						
★2N1011	G	P		2N1011	AP	35	C	80	S	5.0	30	3.0 A	0.15 E			3/
2N1012	G	N			S	0.15	A	22	0		40	100 m	120 E	20	150/200	5/
2N1014	G	P			AP	50	C	65	0	5.0	20	4.0 A	0.4 B			
2N1015	S	N	2N3713	2N3713	SP	150	C	30	V	7.5	10	2.0 A				
2N1015A	S	N	2N3713	2N3713	SP	150	C	60	V	7.5	10	2.0 A				
2N1015B	S	N	2N5758		SP	150	C	100	V	7.5	10	2.0 A				
2N1015C	S	N	2N5760		SP	150	C	150	V	7.5	10	2.0 A				
2N1015D	S	N	MJ410	MJ410	SP	150	C	200	V	7.5	10	2.0 A				
2N1015E	S	N	MJ411	MJ410	SP	150	C	250	V	7.5	10	2.0 A				
2N1015F	S	N	MJ411	MJ410	SP	150	C	300	V	7.5	10	2.0 A				
2N1016	S	N	2N3713	2N3713	SP	150	C	30	V	7.5	10	5.0 A				
2N1016A	S	N	2N3713	2N3713	SP	150	C	60	V	7.5	10	5.0 A				
2N1016B	S	N	2N3713	2N3713	SP	150	C	100	V	7.5	10	5.0 A				
2N1016C	S	N	2N5758	2N5758	SP	150	C	150	V	7.5	10	5.0 A				
2N1016D	S	N	2N5760	2N5758	SP	150	C	200	V	7.5	10	5.0 A				
2N1016E	S	N	MJ3430	MJ3430	SP	150	C	250	V	7.5	10	5.0 A				
2N1016F	S	N	MJ3430	MJ3430	SP	150	C	300	V	7.5	10	5.0 A				
2N1017	G	P			S	0.15	A	10	0	0.4	70	20 m	12 B	20		
2N1018	G	P			S	0.2	A	6	0	0.4	70	70 m	16 B	20		9/
★2N1021	G	P		2N1021	AP	50	C	100	X	5.0	23	1.0 A				5/
2N1021A	G	P			AP	150	C	50	0	7.0	30	5.0 A	0.2 T			3/
★2N1022	G	P		2N1021	AP	50	C	120	X	5.0	23	5.0 A				3/
2N1022A	G	P			AP	150	C	55	0	7.0	30	5.0 A	0.2 T			
2N1023	G	P	2N3323	2N3323	A	0.12	A	40	0	0.01	20	1.5 m	96 T	3.0		
2N1024	S	P	2N3250	2N3250	A	0.25	A	15	U	0.1			0.8 B	7.0		5/
2N1025	S	P	2N3250	2N3250	A	0.25	A	35	U	0.1			0.8 B	7.0		5/
2N1026	S	P	2N3250	2N3250	A	0.25	A	35	U	0.1			1.6 B	7.0		5/
2N1027	S	P	2N3250	2N3250	A	0.25	A	15	U	0.1			3.2 B	7.0		5/
2N1028	S	P			A	0.25	A	10	U	0.1			7.2	7.0		5/
2N1029	G	P	2N1553	2N1539	AP	90	C	20	0	15	20	10 A				
2N1029A	G	P	2N1554	2N1539	AP	90	C	30	0	15	20	10 A				
2N1029B	G	P	2N1555	2N1539	AP	90	C	60	0	15	20	10 A				
2N1029C	G	P	2N1556	2N1539	AP	90	C	70	0	15	20	10 A				
2N1030	G	P	2N1557	2N1539	AP	90	C	20	0	15	50	10 A				
2N1030A	G	P	2N1558	2N1539	AP	90	C	30	0	15	50	10 A				41/
2N1030B	G	P	2N1559	2N1539	AP	90	C	60	0	15	50	10 A				41/
2N1030C	G	P	2N1560	2N1539	AP	90	C	70	0	15	50	10 A				41/
2N1031	G	P	2N1553	2N1539	AP	90	C	30	S	15	20	10 A	0.04 E			41/
2N1031A	G	P	2N1554	2N1539	AP	90	C	40	S	15	20	10 A	0.04 E			41/
2N1031B	G	P	2N1555	2N1539	AP	90	C	70	S	15	20	10 A	0.04 E			41/
2N1031C	G	P	2N1556	2N1539	AP	90	C	80	S	15	20	10 A	0.04 E			41/
2N1032	G	P			AP	90	C	30	S	15	50	10 A	0.1 E			41/
2N1032A	G	P			AP	90	C	40	S	15	50	10 A	0.1 E			41/
2N1032B	G	P			AP	90	C	70	S	15	50	10 A	0.1 E			41/
2N1032C	G	P			AP	90	C	80	S	15	50	10 A	0.1 E			41/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N1034	S	P			A	0.25	A	40	0	0.05			0.12 B			5/
2N1035	S	P			A	0.25	A	35	0	0.05			0.16 B			5/
2N1036	S	P			A	0.25	A	30	0	0.05			0.24 B			5/
2N1037	S	P			A	0.25	A	35	0	0.05			0.12 B			5/
★2N1038	G	P		2N1038	AP	20	C	40	V	3.0	20	1.0 A	0.16 E			/180
★2N1039	G	P		2N1038	AP	20	C	60	V	3.0	20	1.0 A	0.16 E			/180
★2N1040	G	P		2N1038	AP	20	C	80	V	3.0	20	1.0 A	0.16 E			/180
★2N1041	G	P		2N1038	AP	20	C	100	V	3.0	20	1.0 A	0.16 E			/180
★2N1042	G	P		2N1042	AP	20	C	40	V	3.5	20	3.0 A	0.25 T			/184
★2N1043	G	P		2N1042	AP	20	C	60	V	3.5	20	3.0 A	0.25 T			/184
★2N1044	G	P		2N1042	AP	20	C	80	V	3.5	20	3.0 A	0.25 T			/184
★2N1045	G	P		2N1042	AP	20	C	100	V	3.5	20	3.0 A	0.25 T			/184
2N1046	G	P			AHP	50	C	50	0	12	40	5.0 A	15 T			3/
2N1046A	G	P			AHP	50	C	50	0	12	40	5.0 A	15 T			3/
2N1046B	G	P			AHP	50	C	50	0	12	20	10 A	15 T			3/
2N1047	S	N		2N4912	AP	40	C	80	B	0.5	12	500 m				
2N1047A	S	N		2N4912	AP	40	C	80	0	0.5	12	500 m	2.25 E			57/
2N1047B	S	N		2N4912	AP	40	C	80	0	0.75	12	500 m	3.75 E			
2N1047C	S	N		2N4912	AP	40	C	80	0	1.0	12	500 m	3.75 E			
2N1048	S	N		2N5759	AP	40	C	120	B	0.5	12	500 m				
2N1048A	S	N		2N5759	AP	40	C	120	0	0.5	12	500 m	2.25 E			57/
2N1048B	S	N		2N5759	AP	40	C	120	0	0.75	12	500 m	3.75 E			
2N1048C	S	N		2N5759	AP	40	C	120	0	1.0	12	500 m	3.75 E			
2N1049	S	N	2N4239	2N4237	AP	40	C	80	B	0.5	30	500 m	2.25 E			57/
2N1049A	S	N	2N4239	2N4237	AP	40	C	80	0	0.5	30	500 m	2.25 E			57/
2N1049B	S	N	2N4239	2N4237	AP	40	C	80	0	0.75	30	500 m	3.75 E			57/
2N1049C	S	N			AP	40	C	80	0	1.0	30	500 m	3.75 E			57/
2N1050	S	N	2N5681	2N5681	AP	40	C	120	B	0.5	30	500 m				57/
2N1050A	S	N	2N5682	2N5681	AP	40	C	120	0	0.5	30	500 m	2.25 E			57/
2N1050B	S	N	2N5682	2N5681	AP	40	C	120	0	0.75	30	500 m	3.75 E			57/
2N1050C	S	N			AP	40	C	80	0	1.0	30	500 m	3.75 E			58/
2N1051	S	N	2N2218	2N2218	AH	0.5	A	40	0		25	50 m	80 T			
2N1052	S	N			A	0.6	A	180	S	0.2	20	0.2 A				5/
2N1053	S	N			A	0.6	A	200	S	0.2	20	0.2 A				5/
2N1054	S	N	MPSL01	MPS-L01	A	0.6	A	115	0	0.75	20	0.2 A	8.0 T	120		5/
2N1055	S	N	2N4410	2N4409	A	0.6	A	100	0	0.2	20	50 m	3.0 T	100		5/
2N1056	G	P	2N2043	2N2042	A	0.24	A	50	R	0.3	18	20 m	0.4 B	60		5/
2N1057	G	P	2N1924	2N1924	A	0.24	A	45	V	0.3	34	20 m	0.4 B	60		5/
2N1058	G	N				0.05	A	20	R	0.05			3.2 B			22/
2N1059	G	N			A	0.18	A	15	R	0.1		10 m	0.2 E			22/
2N1060	S	N	2N2501	2N2501	SH	0.25	A	40	0	0.05	17	5.0 m		10	500/500	28/
2N1065	G	P			A	0.12	A	20	0		20		10 T	7.0		9/
2N1066	G	P	2N3323	2N3323	AH	0.12	A	40	0	0.01	20	1.5 m		3.0		
2N1067	S	N	2N4237	2N4237	SP	5.0	C	30	0	0.5	15	200 m	0.6 B			8/
2N1068	S	N	2N4237	2N4237	SP	10	C	30	0	1.5	15	750 m	0.6 B			8/
2N1069	S	N	2N5067	2N5067	SP	50	C	45	0	4.0	20	1.5 A	0.4 B			3/
2N1070	S	N	2N5067	2N5067	SP	50	C	45	0	4.0	20	1.5 A	0.4 B			3/
2N1072	S	N	2N3766	2N3766	SP	2.0	A	30	0	2.0	20	.75 A			100/300	
★2N1073	G	P		2N1073	AP	85	C	40	R	10	20	5.0 A				41/
★2N1073A	G	P		2N1073	AP	8.5	C	80	R	10	20	5.0 A				41/
★2N1073B	G	P		2N1073	AP	85	C	120	R	10	20	5.0 A				41/
2N1074	S	N	2N2218	2N2218	A	0.25	A	40	0	0.05			0.16 B	70		5/
2N1075	S	N	2N2218	2N2218	A	0.25	A	35	0	0.05			0.2 B	70		5/
2N1076	S	N	2N2218	2N2218	A	0.25	A	30	0	0.05			0.24 B	70		5/
2N1077	S	N	2N2218	2N2218	A	0.25	A	35	0	0.05			0.16 B	70		5/
2N1078	G	P			AP	20	C	60	S	3.0	40	0.5 A				18/
2N1079	S	N	2N5068	2N5067	AHP	60	C	60	S	3.0	20	1.0 A	10 T			53/
2N1080	S	N	2N4914	2N4913	AHP	60	C	60	S	3.0	20	2.0 A	10 T			53/
2N1081	S	N	2N2221	2N2218	S	0.6	A	40	0	0.75	20	0.5 A		100		5/
2N1082	S	N	2N2221	2N2218	AH	0.2	A	25	S	0.05	10	10 m	17 T			5/
2N1086	G	N			AH	0.065	A	9	0		17	1.0 m				
2N1086A	G	N			AH	0.065	A	9	0		17	1.0 m				
2N1087	G	N			AH	0.065	A	9	0		17	1.0 m				
2N1090	G	N			S	0.12	A	25	B	0.4	30	20 m	4.0 B			9/
2N1091	G	N			S	0.12	A	25	B	0.4	40	20 m	8.0 B			9/
2N1092	S	N	2N4237	2N4237	SP	2.0	A	30	0	0.5	15	200 m	0.6 B			5/
2N1093	G	P			A	0.15	A	15	0	0.3	50	20 m	4.0 B			5/
2N1094	G	P			AH	0.15	A	15	0	0.04	15	4.0 m	560 M	3.0		28/
2N1097	G	P	2N1414	2N1413	A	0.2	A	18	R	0.2	34	20 m	0.8 B	40		5/
2N1098	G	P	2N1414	2N1413	A	0.2	A	18	R	0.2	25	20 m	0.8 B	40		5/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	Case No.
★2N1099	G	P		2N277	AP	50	C	70	S	15	35	5.0 A	0.1 E			36/	
★2N1100	G	P		2N174	AP	50	C	65	0	15	25	5.0 A				36/	
2N1101	G	N			A	0.18	A	15	R		25	35 m	0.25 E				
2N1102	G	N			A	0.18	A	25	R		25	35 m	0.25 E				
2N1103	S	N	2N2221	2N2218	A	0.125	A	35	0	0.02	30	10 m	8.0 B	3.0	500/1000	43/	
2N1104	S	N	2N2221	2N2218	A	0.125	A	35	0	0.02	45	10 m	16 B	3.0	500/1000	43/	
2N1105	S	N	MM3005	MM3005	A	0.8	A	60	0	0.5	12	200 m				43/	
2N1106	S	N	MM3007	MM3005	A	0.8	A	100	0	0.5	12	200 m				43/	
2N1107	G	P			AH	0.03	C	16	B	0.005			32 B			22/	
2N1108	G	P			AH	0.03	C	16	B	0.005			28 B			22/	
2N1109	G	P			AH	0.03	C	16	B	0.005			28 B			22/	
2N1110	G	P			AH	0.03	C	16	B	0.005			28 B			22/	
2N1111	G	P			AH	0.03	C	20	B	0.005			28 B			22/	
2N1114	G	N			S	0.15	A	15	R	0.2	40	20 m	5.6 B			5/	
2N1115	G	P			S	0.15	A	15	0	0.125			4.0 B	20			
2N1115A	G	P			S	0.15	A	15	0	0.125			4.0 B	20			
2N1116	S	N	MM3005	MM3005	AH	0.6	C	60	0	0.8	40	0.5 A	6.0 T	100		5/	
2N1117	S	N	MM3005	MM3005	AH	0.6	C	60	0	0.8	40	0.2 A	4.0 T	100		5/	
2N1118	S	P	2N3250	2N3250	AH	0.15	A	25	U	0.05			8.0 M	12		5/	
2N1118A	S	P	2N3250	2N3250	AH	0.15	A	25	U	0.05		15 m	7.2 T	12		5/	
2N1119	S	P	2N3546	2N3546	S	0.15	A	10	U	0.05	15	15 m	7.2 T	12		5/	
★2N1120	G	P		2N1120	AP	45	C	70	S	15	20	10 A	0.06 E			41/	
2N1121	G	N			AH	0.065	C	15	0		34	1.0 m					
2N1122	G	P	2N961	2N956	SH	0.025	A	11	S	0.05	25	10 m	40 T	6.0		24/	
2N1122A	G	P	2N960	2N956	SH	0.025	A	14	S	0.05	25	10 m	40 T	6.0		24/	
2N1123	G	P	2N3427	2N3427	SH	0.01	C	40	S	0.4	40	100 m	2.4 B				
2N1124	G	P	2N651	2N650	A	0.3	A	35	V	0.15			0.32 B				
2N1125	G	P	2N651	2N650	SH	0.3	A	40	V	0.15	50	500 m	0.8 B				
2N1126	G	P	2N651	2N650	S	1.0	C	35	V	0.15			0.32 B				
2N1127	G	P	2N3428	2N3427	S	1.0	C	40	V	0.15	50	500 m	0.8 B				
2N1128	G	P	2N1192	2N1191	A	0.15	A	18	S	0.15							
2N1129	G	P	2N3427	2N3427	A	0.15	A	25	V	0.15	100	100 m					
2N1130	G	P	2N1193	2N1191	A	0.15	A	30	B	0.15	50	100 m					
2N1131	S	P		2N1131	S	0.6	A	35	0	0.6	20	150 m	50 T			5/	
2N1131A	S	P		2N1131	S	0.6	A	40	0	0.6	20	.15 A	50 T	30	35/35		
2N1132	S	P		2N722	S	0.6	A	35	0		30	150 m	60 T			5/	
2N1132A	S	P		2N722	S	0.6	A	40	0	0.6	30	.15 A	60 T	30	35/35	5/	
2N1132B	S	P			S	0.6	A	45	0	0.6	30	.15 A	60 T	30	45/35	5/	
2N1135	S	P	2N2369	2N2369	S	0.1	A	12	0	0.05			5.6 T			5/	
2N1135A	S	P	2N2369	2N2369	S	0.1	A	12	0	0.05			5.6 T			5/	
2N1136	G	P			AP	50	C	30	0	6.0	50	3.0 A	0.2 E			3/	
2N1136A	G	P			AP	50	C	55	0	6.0	50	3.0 A	0.2 E			3/	
2N1136B	G	P			AP	50	C	65	0	6.0	50	3.0 A	0.2 E			3/	
2N1137	G	P			AP	50	C	30	0	6.0	75	3.0 A	0.2 E			3/	
2N1137A	G	P			AP	50	C	55	0	6.0	75	3.0 A	0.2 E			3/	
2N1137B	G	P			AP	50	C	65	0	6.0	75	3.0 A	0.2 E			3/	
2N1138	G	P			AP	35	C	30	0	6.0	100	3.0 A	0.2 E			3/	
2N1138A	G	P			AP	35	C	55	0	6.0	100	3.0 A	0.2 E			3/	
2N1138B	G	P			AP	35	C	65	0	6.0	100	3.0 A	0.2 E			3/	
2N1139	S	N	2N742	2N742	SH	0.5	A	15	0	0.1	20	10 m	100 T	12		5/	
★2N1141	G	P		2N1141	AH	0.75	C	35	B	0.1	10	10 m		1.5		5/	31
2N1141A	G	P			AH	0.75	C	25	S	0.1	15	10 m	500 T				
★2N1142	G	P		2N1141	AH	0.75	C	30	B	0.1	10	10 m	480 B			5/	31
2N1142A	G	P			AH	0.75	C	25	S	0.1	15	10 *	400 T				
★2N1143	G	P		2N1141	AH	0.75	C	25	B	0.1	10	10 m	384 B			5/	31
2N1143A	G	P			AH	0.75	C	25	S	0.1	15	10 m	400 T				
2N1144	G	P	2N321	2N319	A	0.175	A	16	R	0.2	34	20 m	0.8 B	60			
2N1145	G	P	2N1414	2N1413	A	0.175	A	16	R	0.2	25	20 m	0.8 B	60			
2N1146	G	P			SP	87	C	20	0	15	60	5.0 A	9.0 E			3/	
2N1146A	G	P			SP	87	C	30	0	15	60	5.0 A	9.0 E			3/	
2N1146B	G	P			SP	87	C	40	0	15	60	5.0 A	9.0 E			3/	
2N1146C	G	P			SP	87	C	50	0	15	60	5.0 A	9.0 E			3/	
2N1147	G	P			SP	87	C	20	0	15	60	5.0 A	9.0 E			3/	
2N1147A	G	P			SP	87	C	30	0	15	60	5.0 A	9.0 E			3/	
2N1147B	G	P			SP	87	C	40	0	15	60	5.0 A	9.0 E			3/	
2N1147C	G	P			SP	87	C	50	0	15	60	5.0 A	9.0 E			3/	
2N1149	S	N	2N2221	2N2218	A	0.15	A	45	B	0.25	9.0	25 m	3.2 B				
2N1150	S	N	2N2221	2N2218	A	0.15	A	45	B	0.25	18	25 m	4.0 B				
2N1151	S	N	2N2221	2N2218	A	0.15	A	45	B	0.25	18	25 m	6.4 B				
2N1152	S	N	2N2221	2N2218	A	0.15	A	45	B	0.25	36	25 m	4.8 B				

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	PACKAGE Case No.
2N1153	S	N	2N2221	2N2218	A	0.15	A	45	B	0.25	76	25 m	5.6 B				
2N1154	S	N	2N2221	2N2218	A	0.75	C	50	B	0.06	9.0	60 m					
2N1155	S	N	2N2221	2N2218	A	0.75	C	80	B	0.05	9.0	50 m					
2N1156	S	N	2N2221	2N2218	A	0.75	C	120	B	0.04	9.0	40 m					
2N1157	G	P	MP501	MP500	SP	187	C	45	0	0.04	38	10 A	0.075 T				
2N1157A	G	P	MP502	MP500	SP	187	C	50	0	0.04	38	10 A	0.075 T				
2N1158	G	P	2N1143	2N1141	AH	0.06	A	20	S	0.1	5.0	3 m				9	
2N1158A	G	P	2N1142	2N1141	AH	0.075	A	20	S	0.1	9.0	3 m				9	
2N1159	G	P	2N3616	2N3615	SP	35	C	60	0	5.0	30	3.0 A					
2N1160	G	P	2N3616	2N3615	SP	35	C	60	0	7.0	20	5.0 A					
★2N1162	G	P		2N1162	SP	90	C	35	S	25	15	25 A	0.015 E			3	
★2N1162A	G	P		2N1162	SP	90	C	35	S	25	15	25 A	0.045 E			3	
★2N1163	G	P		2N1162	SP	90	C	35	S	25	15	25 A	0.015 E			41	
★2N1163A	G	P		2N1162	SP	90	C	35	S	25	15	25 A	0.045 E			41	
★2N1164	G	P		2N1162	SP	90	C	60	S	25	15	25 A	0.015 E			3	
★2N1164A	G	P		2N1162	SP	90	C	60	S	25	15	25 A	0.045 E			3	
★2N1165	G	P		2N1162	SP	90	C	60	S	25	15	25 A	0.015 E			41	
★2N1165A	G	P		2N1162	SP	90	C	60	S	25	15	25 A	0.045 E			41	
★2N1166	G	P		2N1162	SP	90	C	75	S	25	15	25 A	0.015 E			3	
★2N1166A	G	P		2N1162	SP	90	C	75	S	25	15	25 A	0.045 E			3	
★2N1167	G	P		2N1162	SP	90	C	75	S	25	15	25 A	0.015 E			41	
★2N1167A	G	P		2N1162	SP	90	C	75	S	25	15	25 A	0.045 E			41	
2N1168	G	P	2N3614	2N3611	AP	45	C	30	R	5.0							
2N1169	G	N			S	0.12	A	20	0	0.4	20	200 m	3.6 B				
2N1170	G	N			S	0.12	A	20	0	0.4	20	200 m	3.6 B			5	
2N1171	G	P			S	0.17	A	12	0	0.4	30	30 m	8.0 B	20		5	
2N1172	G	P	2N2137	2N2137	SP	5.0	C	30	0	1.5	30	100 m				5	
2N1173	G	N			S	0.25	A	20	0	0.2	50	10 m		25	500/1500	37	
2N1174	G	P			S	0.25	A	20	0	0.2	50	10 m		25	500/1500	29	
★2N1175	G	P		2N1413	A	0.2	A	25	R	0.2	70	20 m	1.2 B	40		29	
2N1176	G	P	2N1189	2N1189	A	0.3	A	35	R	0.3	20	10 m				5	31
2N1176A	G	P			A	0.3	A	40	0	0.3	20	10 m				5	
2N1176B	G	P			A	0.3	A	60	0	0.3	20	10 m				5	
2N1177	G	P	2N2957	2N2955	AH	0.08	A	30	B	0.01						45	
2N1178	G	P	2N2955	2N2955	AH	0.08	A	30	B	0.01						45	
2N1179	G	P	2N2956	2N2955	AH	0.08	A	30	B	0.01						45	
2N1180	G	P	2N2956	2N2955	AH	0.08	A	30	B	0.01						45	
2N1182	G	P	2N3616	2N3615	SP	106	C	60	0	5.0	30	0.5 A	0.15 E			3	
2N1183	G	P	2N3616	2N3615	SP	7.5	C	20	0		20	400 m	0.4 B			8	
2N1183A	G	P	2N2140	2N2137	SP	7.5	C	30	0		20	400 m	0.4 B			8	
2N1183B	G	P	2N2141	2N2137	SP	7.5	C	40	0		20	400 m	0.4 B			8	
2N1184	G	P	2N2144	2N2137	SP	7.5	C	20	0		40	400 m	0.4 B			8	
2N1184A	G	P	2N2145	2N2137	SP	7.5	C	30	0		40	400 m	0.4 B			8	
2N1184B	G	P	2N2146	2N2137	SP	7.5	C	40	0		40	400 m	0.4 B			8	
★2N1185	G	P		2N1185	A	0.2	A	30	R	0.5	130	10 m	1.36 B	25		5	31
★2N1186	G	P		2N1185	A	0.2	A	45	R	0.5	33	10 m	0.6 B	25		5	31
★2N1187	G	P		2N1185	A	0.2	A	45	R	0.5	45	10 m	0.8 B	25		5	31
★2N1188	G	P		2N1185	A	0.2	A	45	R	0.5	80	10 m	0.96 B	25		5	31
★2N1189	G	P		2N1189	A	0.2	A	30	R	0.5	60	10 m	1.36 B	25		5	31
★2N1190	G	P		2N1189	A	0.2	A	30	R	0.5	100	10 m	1.76 B	25		5	31
★2N1191	G	P		2N1191	A	0.2	A	25	R	0.2	20	10 m				5	31
★2N1192	G	P		2N1191	A	0.2	A	25	R	0.2	40	10 m				5	31
★2N1193	G	P		2N1191	A	0.2	A	25	R	0.2	70	10 m				5	31
★2N1194	G	P		2N1191	A	0.2	A	25	R	0.2	125	10 m				5	31
★2N1195	G	P		2N1141	AH	0.225	A	30	B	0.04			400 T			5	31
2N1196	S	P			AH	0.35	A	70	0	0.1	5.0	2.0 m		4.0		5	
2N1197	S	P			AH	0.35	A	70	0	0.1	5.0	2.0 m		40		5	
2N1198	G	N			SH	0.065	A	25	0	.075	17	8.0 m	4.0 B				
2N1199	S	N	2N835	2N834	SH	0.15	A	15	0	0.1	12	20 m	75 T			9	
2N1199A	S	N	2N835	2N834	SH	0.15	A	15	0	0.1	12	20 m	75 T	3.5		9	
2N1200	S	N			AH	0.1	A	15	0	0.1	7.0	1.5 m		3.5		9	
2N1201	S	N			AH	0.1	A	15	0	0.1	7.0	1.5 m		3.5		9	
2N1202	G	P	2N2145	2N2137	SP	34	C	60	0		40	500 m	0.2 T				
2N1203	G	P	2N2146	2N2137	SP	34	C	70	0		25	2.0 A	0.2 T				
★2N1204	G	P		2N1204	SH	0.2	A	15	0	0.5	15	400 m	220 T	8.0			
★2N1204A	G	P		2N1204	SH	0.2	A	15	0	0.5	25	200 m	220 T	6.5		9	
2N1206	S	N	2N3020	2N3019	AH	3.0	A	60	0	0.015	20		10 T	50		5	31
2N1207	S	N	2N3500	2N3498	AH	3.0	A	125	0	0.015	20		10 T	50		5	
2N1208	S	N	2N5477	2N5477	AP	45	C	60	0	5.0	15	2.0 A				5	
2N1209	S	N	2N5477	2N5477	AHP	45	C	45	0	5.0	20	2.0 A	3.0 T				

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No.	Case No.
2N1210	S	N	2N4232	2N4321	AHP	30	C	60	0		15	2.0 A	3.0 T				
2N1211	S	N	2N4233	2N4321	AHP	30	C	80	V	5.0	15	2.0 A	3.0 T				
2N1212	S	N	2N5477	2N5477	AHP	45	C	60	0	5.0	12	1.0 A	3.0 T				
2N1213	G	P		TABLE7	THY												
2N1214	G	P		TABLE7	THY												
2N1215	G	P		TABLE7	THY												
2N1216	G	P		TABLE7	THY												
2N1217	G	N			SH	0.075	A	20	0	0.25	40	500 *	4.8 B				
2N1218	G	N			AP	20	C	45	R	3.0	30	1.0 A	0.21 E			3/	
2N1219	S	P	2N3250	2N3250	A	0.25	A	25	0	0.1	18	5.0 m	4.0 B	15		5/	
2N1220	S	P	2N3250	2N3250	A	0.25	A	25	0	0.1	9.0	5.0 m	1.6 B	18		5/	
2N1221	S	P	2N3250	2N3250	A	0.25	A	25	0	0.1			4.0 B	15		5/	
2N1222	S	P	2N3250	2N3250	A	0.25	A	25	0	0.1			1.6 B	18		5/	
2N1223	S	P	2N3250	2N3250	A	0.25	A	40	0	0.1						5/	
2N1224	G	P			SH	0.12	A	40	R	0.01		1.5 m				12/	
2N1225	G	P			AH	0.12	A	40	R	0.01		1.5 m				12/	
2N1226	G	P			AH	0.12	A	60	R	0.01		1.5 m				33/	
2N1227	G	P	2N3611	2N3611	AP	50	C	20	0	3.0	50	0.5 A	0.15 E			3/	
2N1228	S	P	2N2904	2N2904	S	0.4	A	15	0			10 m				5/	
2N1229	S	P	2N2904	2N2904	S	0.4	A	15	0			10 m				5/	
2N1230	S	P	2N2904	2N2904	S	0.4	A	35	0			10 m				5/	
2N1231	S	P	2N2904	2N2904	S	0.4	A	35	0			10 m				5/	
2N1232	S	P	2N2905A	2N2904	S	0.4	A	60	0			10 m				5/	
2N1233	S	P	2N2905A	2N2904	S	0.4	A	60	0			10 m				5/	
2N1234	S	P	2N3495	2N3494	S	0.4	A	110	0			10 m				5/	
2N1235	S	N	2N5759	2N5758	AP	85	C	120	R	2.0	12	1.0 A	0.6 E			53/	
2N1238	S	P	2N3467	2N3467	S	1.0	A	15	0			10 m					
2N1239	S	P	2N3467	2N3467	S	1.0	A	15	0			10 m					
2N1240	S	P	2N3467	2N3467	S	1.0	A	35	0			10 m					
2N1241	S	P	2N3467	2N3467	S	1.0	A	35	0			10 m					
2N1242	S	P	2N3763	2N3763	S	1.0	A	60	0			10 m					
2N1243	S	P	2N3763	2N3763	S	1.0	A	60	0			10 m					
2N1244	S	P			S	1.0	A	110	0			10 m					
2N1245	G	P			AP	20	C	25	R	4.0	50	0.5 A				3/	
2N1246	G	P			AP	20	C	25	R	4.0	50	0.5 A				3/	
2N1247	S	N	2N2222	2N2219	A	0.03	A	6	0	0.005	15	5.0 *				5/	
2N1248	S	N	2N2222	2N2219	A	0.03	A	6	0		15	20 *					
2N1249	S	N	2N2222	2N2219	A	0.03	A	6	0	0.005	20	30 *				5/	
2N1250	S	N	2N4914	2N4913	AP	85	C	60	0	5.0	15	2.0 A					
2N1251	G	N			A	0.15	A	15	R	0.1		1.0 m	0.6 B			22/	
2N1252	S	N	2N4237	2N4237	S	0.6	A	20	R		15	150 m	40 T	45		5/	
2N1252A	S	N	2N2537	2N2537	S	0.8	A	30	0	1.0	15	150 m	40 T	45		5/	
2N1253	S	N	2N4237	2N4237	S	0.6	A	20	R		30	150 m	50 T	45		5/	
2N1253A	S	N	2N2537	2N2537	S	0.8	A	30	0	1.0	30	150 m	50 T	45		5/	
2N1254	S	P	MM869B	2N869A	SH	0.275	A	30	0	0.1	25	10 m	30 T	10	25/40	5/	
2N1255	S	P	MM869B	2N869A	SH	0.275	A	30	0	0.1	40	10 m	50 T	10	25/60	5/	
2N1256	S	P			SH	0.275	A	40	0	0.1	25	10 m	30 T	10	25/40	5/	
2N1257	S	P			SH	0.275	A	40	0	0.1	40	10 m	50 T	10	25/60	5/	
2N1258	S	P	MM869B	2N869A	SH	0.275	A	30	0	0.1	75	10 m	50 T	10	25/60	5/	
2N1259	S	P			SH	0.275	A	50	0	0.1	25	10 m	40 T	10	25/60	5/	
2N1260	S	N	2N5479	2N5477	AP	85	C	120	R	2.0	12	1.0 A	0.6 E			53/	
2N1261	G	P	2N1531	2N1529	SP	34	C	45		3.5	20	2.0 A	0.2 T				
2N1262	G	P	2N1531	2N1529	SP	34	C	45	0	3.5	30	2.0 A	0.2 T				
2N1263	G	P	2N3617	2N3615	SP	34	C	45	0	3.5	45	2.0 A	0.2 T				
2N1264	G	P	2N1191	2N1191	AH	0.05	A	20	B		15						
2N1265	G	P	2N1192	2N1191	AH	0.1	A	10	R	.1	50	1.0 m	0.8 B	25		5/	
2N1266	G	P	2N1191	2N1191	AH	0.08	A	10	0			1.0 m				22/	
2N1267	S	N	2N2481	2N2481	AH	0.15	A	15	0	0.1	4.0	1.5 m				9/	
2N1268	S	N	2N2481	2N2481	AH	0.15	A	15	0	0.1	7.0	1.5 m				9/	
2N1269	S	N	2N2481	2N2481	AH	0.15	A	15	0	0.1	20	1.5 m				9/	
2N1270	S	N	2N2481	2N2481	AH	0.15	A	15	0	0.1	4.0	1.5 m				9/	
2N1271	S	N	2N2481	2N2481	AH	0.15	A	15	0	0.1	7.0	1.5 m				9/	
2N1272	S	N	2N2481	2N2481	AH	0.15	A	15	0	0.1	20	1.5 m				9/	
2N1273	G	P			A	0.25	A	15	R	0.2	27	50 m				5/	
2N1274	G	P			A	0.25	A	25	R	0.2	27	50 m				5/	
2N1275	S	P			AM	0.25	A	80	0	0.05	9.0	1.0 m	0.08 B	110		5/	
2N1276	S	N	2N2501	2N2501	A	0.15	A	30	0	0.25			12 B	5.0		5/	
2N1277	S	N	2N2501	2N2501	A	0.15	A	30	0	0.25			12 B	5.0		5/	
2N1278	S	N	2N2501	2N2501	A	0.15	A	30	0	0.25			12 B	5.0		5/	
2N1279	S	N	2N2501	2N2501	A	0.15	A	30	0	0.25			12 B	5.0		5/	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No.	Case No.
2N1280	G	P			S	0.2	A	16	0	0.4	40	20 m	4.0 B	20		5/	
2N1281	G	P			S	0.2	A	12	0	0.4	60	20 m	5.6 B	20		5/	
2N1282	G	P			S	0.2	A	6	0	0.4	70	20 m	8.0 B	20		5/	
2N1284	G	P			S	0.15	A	15	0		30	10 m	4.0 B				
2N1285	G	P			AH	0.24	A	40	V	0.01	30	1.5 m		3.0		33/	
2N1287	G	P	2N651	2N650	A	0.3	C	25	R	0.3	40					5/	
2N1287A	G	P	2N652	2N650	A	0.3	C	25	R	0.3	60					5/	
2N1288	G	N			SH	0.075	A	10	R	0.05	50	10 m		10	100/400	39/	
2N1289	G	N			SH	0.075	A	15	0	0.05	50	10 m	32 B	10		39/	
2N1291	G	P	2N1529	2N1529	AP	20	C	30	S	3.0	40	0.5 A				3/	
2N1292	G	N			AP	25	C	30	S	3.0	30	0.5 A				3/	
2N1293	G	N	2N1531	2N1529	AP	20	C	60	S	3.0	30	05 A				3/	
2N1294	G	N			AP	25	C	45	S	3.0	30	0.5 A				3/	
2N1295	G	P	2N1532	2N1529	AP	200	C	80	S	3.0	40	0.5 A				3/	
2N1296	G	N			AP	25	C	60	S	3.0	30	0.5 A				3/	
2N1297	G	P	2N1533	2N1529	AP	20	C	100	S	3.0	40	0.5 A				3/	
2N1298	G	N			AP	25	C	80	S	3.0	30	0.5 A				3/	
2N1299	G	N			S	0.15	A	20	R	0.2	35	50 m	3.2 B			5/	
2N1300	G	P			SH	0.15	A	12	0	0.1	30	10 m	25 T				
2N1301	G	P			SH	.15	A	12	0	.1	30	10 m	35 T			5/	
2N1302	G	N			S	.15	A	25	B	.3	20	10 m	2.4 B	20		5/	
2N1303	G	P	2N1192	2N1191	S	.15	A	30	B	.3	20	10 m	2.4 B	20		5/	
2N1304	G	N			S	.15	A	25	B	.3	40	10 m	4.0 B	20		5/	
2N1305	G	P			S	.15	A	30	B	.3	40	10 m	4.0 B	20		5/	
2N1306	G	N			S	.15	A	25	B	.3	60	10 m	8.0 B	20		5/	
2N1307	G	P			S	.15	A	30	B	.3	60	10 m	8.0 B	20		5/	
2N1308	G	N			S	.15	A	25	B	.3	80	10 m	12 B	20		5/	
2N1309	G	P			S	.15	A	30	B	.3	80	10 m	12 B	20		5/	
2N1309A	G	P			S	.15	A	15	0	.3	80	10 m	12 B	20		5/	
2N1310	G	N			AL	.12	A	90	B		20	5.0 m				9/	
2N1311	S	N			AL	.12	A	75	B		15	5.0 m				5/	
2N1312	G	N			S	.12	A	50	B		20	20 m				5/	
2N1313	G	P			S	.18	A	15	0	.4	40		4.8 B			5/	
2N1314	G	P	2N3611	2N3611	AP	125	C	40	R	3.5	20	1.0 A				3/	
2N1315	G	P	2N3611	2N3611	AP	125	C	16		3.5	45	1.0 A				3/	
2N1316	G	P			S	.2	A	15	0	.4	50		8.0 B	20		5/	
2N1317	G	P			S	.2	A	12	0	.4	45		8.0 B	20		5/	
2N1318	G	P			S	.2	A	6	0	.4	40		8.0 B	20		5/	
2N1319	G	P			S	.12	A	20	V	.4	15	.4 A	3.0 T			5/	
2N1320	G	P			AP	20	C	30	S	3.0	40	.5 A				10/	
2N1321	G	N			AP	25	C	30	S	3.0	30	.5 A				10/	
2N1322	G	P			AP	20	C	60	S	3.0	40	.5 A				10/	
2N1323	G	N			AP	25	C	45	S	3.0	30	.5 A				10/	
2N1324	G	P			AP	20	C	80	S	3.0	40	.5 A				10/	
2N1325	G	N			AP	25	C	60	S	3.0	30	.5 A				10/10	
2N1326	G	P			AP	20	C	100	S	3.0	40	.5 A				10/	
2N1327	G	N			AP	25	C	80	S	3.0	30	.5 A				10/	
2N1328	G	P			AP	20	C	30	S	3.0	40	.5 A				13/	
2N1329	G	N			AP	25	C	30	S	3.0	30	.5 A				13/	
2N1330	G	N			AP	25	C	45	S	3.0	30	.5 A				13/	
2N1331	G	P			AP	20	C	80	S	3.0	40	.5 A				13/	
2N1332	G	N			AP	25	C	60	S	3.0	30	.5 A				13/	
2N1333	G	P			AP	20	C	100	S	3.0	40	.5 A				13/	
2N1334	G	N			AP	25	C	80	S	3.0	30	.5 A				13/	
2N1335	S	N	2N3019	2N3019	AHP	.8	A	45	0	.3	10	30 m	70 T	8.0		5/	
2N1336	S	N	2N3019	2N3019	AHP	.8	A	45	0	.3	10	30 m	70 T	10		5/	
2N1337	S	N	2N3019	2N3019	AHP	.8	A	45	0	.3	10	30 m	70 T	8.0		5/	
2N1338	S	N	2N2193	2N2192	AHP	.8	A	25	0	.3	10	30 m	70 T	10		5/	
2N1339	S	N	2N3019	2N3019	AHP	0.8	A	50	0	0.3	10	30 m	70 T	8.0		5/	
2N1340	S	N	2N3019	2N3019	AHP	0.8	A	50	0	0.3	10	30 m	70 T	8.0			
2N1341	S	N	2N3019	2N3019	AHP	0.8	A	50	0		10	30 m	70 T				
2N1342	S	N	2N3019	2N3019	AHP	0.8	A	65	0	0.3	10	30 m	70 T	8.0		5/	
2N1343	G	P			S	0.15	A	16	0	0.4	15	50 m	3.2 B	20		5/	
2N1344	G	P			S	0.15	A	10	0	0.4	60	20 m	5.6 B	20		5/	
2N1345	G	P			S	0.15	A	8	0	0.4	30	0.4 A	8.0 B			5/	
2N1346	G	P			S	0.15	A	10	0	0.4	40	.35 m	8.0 B			5/	
2N1347	G	P			S	0.15	A	12	0	0.4	30	10 m	8.0 B			5/	
2N1352	G	P	2N651	2N650	A	0.15	A	20	0	0.2	40					5/	
2N1353	G	P			S	0.2	A	10	0	0.2	25	10 m	1.76 B	35		5/	
2N1354	G	P			S	0.2	A	15	0	0.2	25	10 m	2.4 B			5/	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	Case No.
2N1355	G	P			S	0.2	A	20	0	0.2	30	10 m	4.0 B			5/	
2N1356	G	P			S	0.2	A	20	0	0.2	40	10 m	4.0 B	20		5/	
2N1357	G	P			S	0.2	A	15	0	0.2	40	10 m	8.0 B			5/	
★2N1358	G	P		2N174	SP	90	C	40	0		40	1.2 A	0.08 B			36/	5
★2N1358A	G	P		2N174	SP	150	C	60	0	15	40	1.2 A	0.08 B		30k/60k	36/	5
★2N1359	G	P		2N375	AP	90	C	40	S	3.0	35	1.0 A	1.75 E			3/	
★2N1360	G	P		2N375	AP	90	C	40	S	3.0	60	1.0 A	3.0 E	3.0		3/	
2N1361	G	P			S	0.15	A	20	0		40	25 m	3.2 B				
2N1361A	G	P			S	0.2	A	20	0		40	25 m	3.2 B				
★2N1362	G	P		2N375	AP	90	C	75	S	3.0	35	1.0 A	1.75 E			3/	
2N1363	G	P		2N375	AP	90	C	75	S	3.0	60	1.0 A	3.0 E			3/	
★2N1364	G	P		2N375	AP	90	C	100	S	3.0	35	1.0 A	1.75 E			3/	
★2N1365	G	P		2N375	AP	90	C	100	S	3.0	60	1.0 A	3.0 E			3/	
2N1366	G	N			A	0.1	A	18	R	0.025	20	1.0 m	2.0 B	18		5/	
2N1367	G	N			A	0.1	A	18	R	0.025	10	1.0 m	2.0 B	14		5/	
2N1370	G	P			A	0.25	A	25	R	0.2	45	50 m				5/	
2N1371	G	P			A	0.25	A	45	R	0.2	45	50 m				5/	
2N1372	G	P			A	0.25	A	25	R	0.2	27	50 m				5/	
2N1373	G	P			A	0.25	A	45	R	0.2	27	50 m				5/	
2N1374	G	P			A	0.25	A	25	R	0.2	45	50 m				5/	
2N1375	G	P			A	0.25	A	45	R	0.2	45	50 m				5/	
2N1376	G	P			A	0.25	A	25	R	0.2	67	50 m				5/	
2N1377	G	P			A	0.25	A	45	R	0.2	67	50 m				5/	
2N1378	G	P			A	0.25	A	12	R	0.2	85	50 m				5/	
2M1379	G	P			A	0.25	A	25	R	0.2	85	50 m				5/	
2N1380	G	P			A	0.25	A	12	R	0.2	27	50 m				5/	
2N1381	G	P			A	0.25	A	25	R	0.2	27	50 m				5/	
2N1382	G	P			A	0.25	A	25	R	0.2	45	50 m				5/	
2N1383	G	P			A	0.25	A	25	R	0.2	27	50 m				5/	
2N1384	G	P			SH	0.24	A	30	0	0.5	20	200 m	20 T			11/	
2N1385	G	P			SH	0.75	A	10	0	0.1	10	10 m	250 T	2.5			
2N1386	S	N	2N2222	2N2218	S	0.3	A	25	0	0.05	30	10 m				5/	
2N1387	S	N	2N2222	2N2218	S	0.3	A	30	0	0.05	20	10 m				5/	
2N1388	S	N	2N2222	2N2218	AH	0.3	A	25	0	0.05	15	10 m		10		5/	
2N1389	S	N	2N2222	2N2218	AH	0.3	A	50	0	0.05			24 T	6.0		5/	
2N1390	S	N	2N2222	2N2218	AH	0.3	A	20	0	0.05	30	10 m	16 B			5/	
2N1391	G	N			A	0.15	A	18	0		35	1.0 m	2.4 T				
2N1392	G	P			AL	0.05	A	20	R								
2N1393	G	P			AL	0.05	A	10	R								
2N1394	G	P			AL	0.05	A	6	R								
2N1395	G	P	2N2955	2N2955	AH	0.12	A	40	0	0.01	50	1.5 m	24 B	3.0			
2N1396	G	P	2N3323	2N3323	AH	0.12	A	40	0	0.01	50	1.5 m	24 B	3.0			
2N1397	G	P	2N3323	2N3323	AH	0.12	A	40	0	0.01	50	1.5 m	96 B	3.0			
2N1398	G	P			AH	0.05	A	20	0	0.01	10	0.5 m	140 T	3.0			
2N1399	G	P			AH	0.05	A	20	0	0.01	3.5	0.5 m	140 T	3.0			
2N1400	G	P			AH	0.05	A	20	0	0.01	5.0	0.5 m	100 T	3.0			
2N1401	G	P			AH	0.05	A	20	0	0.01	5.0	0.5 m	120 T	3.0			
2N1402	G	P			AH	0.05	A	20	0	0.01	3.5	1.5 m	100 T	3.0			
2N1403	G	P			AH	0.25	A	12	0	0.1	25	7.0 m	200 T				
2N1404	G	P			S	0.15	A	25	B	0.3			32 B	20		5/	
2N1404A	G	P			S	0.15	A	15	0		30	12 m	3.0 T				
2N1405	G	P			AH	0.075	A	20	0	0.05	10	2.0 m	250 T	3.0		12/	
2N1406	G	P			AH	0.075	A	20	0	0.05	10	2.0 m	250 T	3.0		12/	
2N1407	G	P			AH	0.075	A	20	0	0.05	10	2.0 m	200 T	3.0		12/	
★2N1408	G	P		2N1408	S	0.15	A	50	S		10					5/	31
2N1409	S	N	2N2537	2N2537	SH	0.6	A	25	0		15	150 m	200 T				
2N1409A	S	N	2N2537	2N2537	SH	0.8	A	25	0		15	150 m	200 T				
2N1410	S	N	2N2537	2N2537	SH	0.6	A	30	0		39	150 m	130 T				
2N1410A	S	N	2N2537	2N2537	SH	0.8	A	30	0		30	150 m	130 T				
2N1411	G	P	2N962	2N956	S	0.025	A	5	S	0.05	20	50 m	25 T	6.0		24/	
★2N1412	G	P		2N1412	SP	70	C	65	0		25	5.0 A				36/	5
★2N1413	G	P		2N1413	S	0.2	A	25	R	02	25	20 m	0.64 B	40		5/	31
★2N1414	G	P		2N1413	S	0.2	A	25	R	0.2	34	20 m	0.8 B	40		5/	31
★2N1415	G	P		2N1413	S	0.2	A	25	R	02	53	20 m	1.04 B	40		5/	31
2N1416	G	P	2N1193	2N1191	A	0.1	A	18	U								
2N1417	S	N			A	0.15	A	15	0	0.05						5/	
2N1418	S	N			A	0.15	A	30	0	0.05						5/	
2N1419	G	P	2N1164	2N1162	SP	87	C	40	0	25	40	25 A				3/	
2N1420	S	N			AH	0.6	A	30	R	1.0	100	150 m	50 T	35		5/	
2N1420A	S	N	2N2219	2N2218	AH	0.8	A	40	R	1.0	100	150 m	60 T	25		5/	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	PACKAGE Case No.
2N1421	S	N	2N5477	2N5477	AHP	30	C	60	S	3.0	20	1.0 A	10 T				
2N1422	S	N	2N5477	2N5477	AHP	30	C	60	S	3.0	20	1.0 A	10 T			3/	
2N1423	S	N	2N5477	2N5477	AHP	60	C	60	S	3.0	20	2.0 A	10 T			3/	
2N1424	S	N	2N5477	2N5477	AHP	60	C	60	S	3.0	20	2.0 A	10 T				
2N1425	G	P			A	0.08	A			0.01			8.0 B	3.7		7/	
2N1426	G	P			A	0.08	A			0.01			8.0 B	3.7		7/	
2N1427	G	P	2N962	2N956	SH	0.025	A	6.0	S	0.05	20	50 m	50 T			24/	
2N1428	S	P	2N869	2N869	S	0.1	A	6.0	0	0.05	12	5.0 m	16 T	14		1/	
2N1429	S	P	2N869	2N869	S	0.1	A	6.0	0	0.05	12	5.0 m	16 T	14		5/	
2N1430	G	P			SP	70	C	100	0		30	5.0 A	0.6 T				
2N1431	G	N			A	0.18	A	15	R	0.1	75	35 m	0.75 E				
2N1432	G	P			A	0.1	A	45	R	0.01				3.0			
2N1433	G	P			AP			50	0	3.5	20	2.0 A	0.1 E			10/	
2N1434	G	P			AP			50	0	3.5	45	2.0 A	0.225 E			10/	
2N1435	G	P			AP			50	0	3.5	30	2.0 A	0.15 E			10/	
2N1436	G	P			SH	0.05	A	12	S	0.05	20	10 m		5.0	70/100	9/	
2N1437	G	P			AP	23	C	90	S	3.0	20	0.5 A	0.08 E			13/	
2N1438	G	P			AP	23	C	90	S	3.0	20	0.5 A	0.08 E			10/	
2N1439	S	P	2N2907A	2N2904	A	0.4	A	50	0	0.1		1.0 m	0.8 B			5/	
2N1440	S	P	2N2907A	2N2904	A	0.4	A	50	0	0.1		1.0 m	0.8 B			5/	
2N1441	S	P	2N2907A	2N2904	A	0.4	A	35	0	0.1		1.0 m	0.8 B			5/	
2N1442	S	P	2N2907A	2N2904	A	0.4	A	30	0	0.1		1.0 m	0.8 B			5/	
2N1443	S	P	2N2907	2N2904	A	0.4	A	15	0	0.1		1.0 m	0.8 B			5/	
2N1444	S	N	2N2410	2N2910	SH	0.5	A	20	0	0.25	20	.25 A			250/250	29/	
2N1445	S	N	2N5682	2N5681	AP	4.0	C	120	0	0.75	20	200 m	1.5 E			5/	
2N1446	G	P	2N1191	2N1191	A	0.2	A	25	0	0.4	16	20 m	0.64 B			5/	
2N1447	G	P	2N1191	2N1191	A	0.2	A	25	0	0.4	35	20 m	1.2 B			5/	
2N1448	G	P	2N1192	2N1191	A	0.2	A	25	0	0.4	50	20 m	1.6 B			5/	
2N1449	G	P	2N1189	2N1189A	A	0.2	A	25	0	0.4	70	20 m	2.0 B			5/	
2N1450	G	P	2N2955	2N2955	S	0.12	A	20	0	0.1	20	10 m					
2N1451	G	P	2N464	2N464	A	0.2	A	20	0	0.4	20	20 m				5/	
2N1452	G	P	2N1191	2N1191	A	0.2	A	20	0	0.4	30	20 m				5/	
2N1453	G	P			AP			20	0	5.0	40	1.0 A	0.2 E			13/	
2N1454	G	P			AP			20	0	5.0	70	1.0 A	0.35 E			13/	
2N1455	G	P			AP			40	0	5.0	40	1.0 A	0.2 E			13/	
2N1456	G	P			AP			40	0	5.0	70	1.0 A	0.35 E			13/	
2N1457	G	P			AP			60	0	5.0	40	1.0 A	0.2 E			13/	
2N1458	G	P			AP			60	0	5.0	70	1.0 A	0.35 E			13/	
2N1461	G	P			AP			20	0	5.0	40	1.0 A	0.2 E			10/	
2N1462	G	P			AP			20	0	5.0	70	1.0 A	0.35 E			10/	
2N1463	G	P			AP			40	0	5.0	40	1.0 A	0.2 E			10/	
2N1464	G	P			AP			40	0	5.0	70	1.0 A	0.35 E			10/	
2N1465	G	P			AP	20	C	70	0	3.0	20	0.5 A	0.08 E			13/	
2N1466	G	P			AP	20	C	70	0	3.0	20	0.5 A	0.08 E			10/	
2N1469	S	P	2N2906	2N2904	A	0.25	A	35	U	0.1			1.6 B	7.0		5/	
2N1470	S	N	2N5068	2N5067	AP	55	C	60	S	3.0	15	1.0 A				3/	
2N1471	G	P			S	0.2	A	15	R				2.4 B				
2N1472	S	N	2N834	2N834	SH	0.15	A	25	0	0.1	20	10 m	75 T	3.5		9/	
2N1473	G	N			S	0.167	A	20	0	0.4	25	400 m	3.2 B	20		5/	
2N1474	S	P	2N2906A	2N2904	A	0.25	A	60	U	0.1			0.8 B	7.0		5/	
2N1474A	S	P	2N2906A	2N2904	A	0.25	A	60	U	0.1			1.6 B	7.0		5/	
2N1475	S	P	2N2906A	2N2904	A	0.25	A	60	U	0.1			0.8 B	7.0		5/	
2N1476	S	P	2N4928	2N4928	A	0.25	A	100	U	0.1			0.8 B	7.0		5/	
2N1477	S	P	2N4928	2N4928	A	0.25	A	100	U	0.1			0.8 B	7.0		5/	
2N1478	G	P	2N3427	2N3427	S	0.25	A	20	S	0.4	40	100 m	2.4 B			9/	
2N1479	S	N	2N4237	2N4237	SP	5.0	C	60	V	1.5	20	200 m				5/	
2N1480	S	N	2N4238	2N4237	SP	5.0	C	100	V	1.5	20	200 m				5/	
2N1481	S	N	2N4237	2N4237	SP	5.0	C	60	V	1.5	35	200 m				5/	
2N1482	S	N	2N4238	2N4237	SP	5.0	C	100	V	1.5	35	200 m				5/	
2N1483	S	N	2N4231	2N4231	SP	25	C	60	V	3.0	20	750 m				8/	
2N1484	S	N	2N4232	2N4231	SP	25	C	100	V	3.0	20	750 m				8/	
2N1485	S	N	2N4231	2N4231	SP	25	C	60	V	3.0	35	750 m				8/	
2N1486	S	N	2N4232	2N4231	SP	25	C	100	V	3.0	35	750 m				8/	
2N1487	S	N	2N4913	2N4913	SP	75	C	60	V	6.0	15	200 m				3/	
2N1488	S	N	2N4914	2N4913	SP	75	C	100	V	6.0	15	200 m				3/	
2N1489	S	N	2N4913	2N4913	SP	75	C	60	V	6.0	25	1.5 A				3/	
2N1490	S	N	2N4914	2N4913	SP	75	C	100	V	6.0	25	1.5 A				3/	
2N1491	S	N	2N2218	2N2218	AH	3.0	C	30	V	0.1				5.0		39/	
2N1492	S	N	2N2192	2N2192	AH	3.0	C	60	V	0.1				5.0		39/	
2N1493	S	N	2N3500	2N3498	AH	3.0	C	100	V	0.1	4.0			5.0		39/	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
★2N1494	G	P		2N1204	SH	0.4	A	15	0	0.5	15	400 m	220 T	8.0		31/
★2N1494A	G	P		2N1204	SH	0.4	A	15	0	0.5	25	200 m	220 T	8.0		31/
★2N1495	G	P		2N1204	SH	0.3	A	25	0	0.5	25	200 m	150 T	6.5		5/31
2N1495A	G	P			SH	0.25	A	25	0	0.5	25	0.2 A	150 T	6.5		9/
★2N1496	G	P		2N1204	SH	0.5	A	25	0	0.5	25	200 m	150 T	6.5		3/
2N1499	G	P			SH	0.025	A	15	S	0.05	20	10 m				9/
2N1499A	G	P			SH	0.060	A	20	S	0.05	30	10 m	100 T	3.0		9/
2N1499B	G	P			SH	0.075	A	20	0	0.1	40	10 m	150 T	3.0		9/
2N1500	G	P			SH	0.060	A	12	S	0.05	20	10 m	120 T			9/
2N1501	G	P	2N2144	2N2137	SP	27	C	40	0	3.5	25	2.0 A	0.2 T			
2N1502	G	P	2N2143	2N2137	SP	27	C	40	0	3.5	25	2.0 A	0.2 T			
2N1504	G	P			AP	25	C	60	0	3.0	21	0.5 A	0.084 T			
2N1505	S	N	2N2219A	2N2218	AHP	0.8	A	20	0	0.5	7.0	0.1 A	70 T	20		5/
2N1506	S	N	2N4237	2N4237	AHP	0.8	A	20	0	0.5	10	0.1 A	140 T	12		5/
2N1506A	S	N	2N4239	2N4237	AHP	0.8	A	50	0		10	0.1 A	140 T			
2N1507	S	N	2N2219	2N2218	S	2.0	C	25	0	1.0	100	150 m	50 T	35		5/
2N1508	S	N	2N3019	2N3019	S	1.0	A	55	0	1.0	20	600 m	50 T	50	130/320	39/
2N1509	S	N	2N3019	2N3019	S	1.0	A	35	0	1.0	20	600 m	50 T	50	130/320	39/
2N1510	G	N			AL	0.075	A	70	R	0.02	8.0	1.0 m				
2N1511	S	N	2N4913	2N4913	SP	75	C	60	V	6.0	4.0	6.0 A	0.3 T			36/
2N1512	S	N	2N4914	2N4913	SP	75	C	100	V	6.0	4.0	6.0 A	0.3 T			36/
2N1513	S	N	2N4913	2N4913	SP	75	C	60	V	6.0	7.0	6.0 A	0.3 T			36/
2N1514	S	N	2N4914	2N4913	SP	75	C	100	V	6.0	7.0	6.0 A	0.3 T			36/
2N1516	G	P			AH	0.083	A			0.01	20	1.0 m				7/
2N1518	G	P			SP	50	C	40	0	25	15	15 A				36/
2N1519	G	P			SP	50	C	60	0	25	15	15 A				36/
2N1520	G	P			SP	50	C	40	0	35	17	15 A				36/
2N1521	G	P			SP	50	C	60	0	35	17	15 A				36/
2N1522	G	P			SP	50	C	40	B	50	25	15 A				36/
2N1523	G	P			SP	50	C	60	B	50	25	15 A				36/
2N1524	G	P	2N3325	2N3323	AH	0.08	A	24	B	0.01	17	1.0 m		3.6		1/
2N1525	G	P	2N3325	2N3323	AH	0.08	A	24	B	0.01	17	1.0 m		3.6		40/
2N1526	G	P	2N3325	2N3323	AH	0.08	A	24	B	0.01	27	1.0 m				1/
2N1527	G	P	2N3325	2N3323	AH	0.08	A	24	B	0.01	27	1.0 m				40/
2N1528	S	N	2N2218	2N2218	AH	0.15	A	25	S	0.02				8.0		5/
★2N1529	G	P		2N1529	AP	90	C	30	S	10	20	3.0 A				
★2N1529A	G	P		2N1529	AP	90	C	20	0	10	20	3.0 A	0.1 E			
★2N1530	G	P		2N1529	AP	90	C	45	S	10	20	3.0 A				
★2N1530A	G	P		2N1529	AP	90	C	30	0	10	20	3.0 A	0.1 E			
★2N1531	G	P		2N1529	AP	90	C	60	S	10	20	3.0 A				
★2N1531A	G	P		2N1529	AP	90	C	40	0	10	20	3.0 A	0.1 E			
★2N1532	G	P		2N1529	AP	90	C	75	S	10	20	3.0 A				
★2N1532A	G	P		2N1529	AP	90	C	50	0	10	20	3.0 A	0.1 E			
★2N1533	G	P		2N1529	AP	90	C	90	S	10	20	3.0 A				
★2N1534	G	P		2N1529	AP	90	C	30	S	10	35	3.0 A				
★2N1534A	G	P		2N1529	AP	90	C	20	0	10	35	3.0 A	0.175 E			
★2N1535	G	P		2N1529	AP	90	C	45	S	10	35	3.0 A				
★2N1535A	G	P		2N1529	AP	90	C	30	0	10	35	3.0 A	0.175 E			
★2N1536	G	P		2N1529	AP	90	C	60	S	10	35	3.0 A				
★2N1536A	G	P		2N1529	AP	90	C	40	0	10	35	3.0 A	0.175 E			
★2N1537	G	P		2N1529	AP	90	C	75	S	10	35	3.0 A				
★2N1537A	G	P		2N1529	AP	90	C	50	0	10	35	3.0 A	0.175 E			
★2N1538	G	P		2N1529	AP	90	C	90	S	10	35	3.0 A				
★2N1539	G	P		2N1539	AP	90	C	30	S	5.0	50	3.0 A				
★2N1539A	G	P		2N1539	AP	90	C	20	0	5.0	50	3.0 A	0.15 E			
★2N1540	G	P		2N1539	AP	90	C	45	S	5.0	50	3.0 A				
★2N1540A	G	P		2N1539	AP	90	C	30	0	5.0	50	3.0 A	0.15 E			
★2N1541	G	P		2N1539	AP	90	C	60	S	5.0	50	3.0 A				
★2N1541A	G	P		2N1539	AP	90	C	40	0	5.0	50	3.0 A	0.15 E			
★2N1542	G	P		2N1539	AP	90	C	75	S	5.0	50	3.0 A				
★2N1542A	G	P		2N1539	AP	90	C	50	0	5.0	50	3.0 A	0.15 E			
★2N1543	G	P		2N1539	AP	90	C	90	S	5.0	50	3.0 A				
★2N1544	G	P		2N1539	AP	90	C	30	S	5.0	75	3.0 A	0.075 E			3/
★2N1544A	G	P		2N1539	AP	90	C	30	S	5.0	75	3.0 A	0.225 E			3/
★2N1545	G	P		2N1539	AP	90	C	45	S	5.0	75	3.0 A	0.075 E			3/
★2N1545A	G	P		2N1539	AP	90	C	45	S	5.0	75	3.0 A	0.225 E			3/
★2N1546	G	P		2N1539	AP	90	C	60	S	5.0	75	3.0 A	0.075 E			3/
★2N1546A	G	P		2N1539	AP	90	C	60	S	5.0	75	3.0 A	0.225 E			3/
★2N1547	G	P		2N1539	AP	90	C	75	S	5.0	75	3.0 A	0.075 E			3/
★2N1547A	G	P		2N1539	AP	90	C	75	S	5.0	75	3.0 A	0.225 E			3/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
★2N1548	G	P		2N1539	AP	90	C	90	S	5.0	75	3.0 A	0.075 E			3/
★2N1549	G	P		2N1549	AP	90	C	30	S	15	10	10 A				
★2N1549A	G	P		2N1549	AP	90	C	30	S	15	10	10 A	0.05 E			
★2N1550	G	P		2N1549	AP	90	C	45	S	15	10	10 A				
★2N1550A	G	P		2N1549	AP	90	C	45	S	15	10	10 A	0.05 E			
★2N1551	G	P		2N1549	AP	90	C	60	S	15	10	10 A				
★2N1551A	G	P		2N1549	AP	90	C	60	S	15	10	10 A	0.05 E			
★2N1552	G	P		2N1549	AP	90	C	75	S	15	10	10 A				
★2N1552A	G	P		2N1549	AP	90	C	75	S	15	10	10 A	0.05 E			
★2N1553	G	P		2N1549	AP	90	C	30	S	15	30	10 A	0.03 E			3/
★2N1553A	G	P		2N1549	AP	90	C	20	0	15	30	10 A	0.09 E			3/
★2N1554	G	P		2N1549	AP	90	C	45	S	15	30	10 A	0.03 E			3/
★2N1554A	G	P		2N1549	AP	90	C	30	0	15	30	10 A	0.09 E			3/
★2N1555	G	P		2N1549	AP	90	C	60	S	15	30	10 A	0.03 E			3/
★2N1555A	G	P		2N1549	AP	90	C	40	0	15	30	10 A	0.09 E			3/
★2N1556	G	P		2N1549	AP	90	C	75	S	15	30	10 A	0.03 E			3/
★2N1556A	G	P		2N1549	AP	90	C	50	0	15	30	10 A	0.09 E			3/
★2N1557	G	P		2N1549	AP	90	C	30	S	15	50	10 A	0.05 E			3/
★2N1557A	G	P		2N1549	AP	90	C	20	0	15	50	10 A	0.15 E			3/
★2N1558	G	P		2N1549	AP	90	C	45	S	15	50	10 A	0.05 E			3/
★2N1558A	G	P		2N1549	AP	90	C	30	0	15	50	10 A	0.15 E			3/
★2N1559	G	P		2N1549	AP	90	C	60	S	15	50	10 A	0.05 E			3/
★2N1559A	G	P		2N1549	AP	90	C	40	0	15	50	10 A	0.15 E			3/
★2N1560	G	P		2N1549	AP	90	C	75	S	15	50	10 A	0.05 E			3/
★2N1560A	G	P		2N1549	AP	90	C	50	0	15	50	10 A	0.15 E			3/
★2N1561	G	P		2N1561	AH	0.25	A	15	0	0.25	5.0	200 m		10		107/23
★2N1562	G	P		2N1561	AH	0.25	A	15	0	0.25	5.0	200 m		10		107/23
2N1564	S	N	2N2218	2N2218	A	0.6	A	60	0	0.05	15	5.0 m				5/
2N1565	S	N	2N2218	2N2218	A	0.6	A	60	0	0.05	30	5.0 m				5/
2N1566	S	N	2N2219	2N2218	A	0.6	A	60	0	0.05	60	5.0 m				5/
2N1566A	S	N	2N2219	2N2218	A	0.6	A	60	0	0.1	60	5.0 m	100 T			5/
2N1572	S	N	2N3020	2N3019	A	0.6	A	80	0	0.05	15	5.0 m				5/
2N1573	S	N	2N3020	2N3019	A	0.6	A	80	0	0.05	30	5.0 m				5/
2N1574	S	N	2N3019	2N3019	A	0.6	A	80	0	0.05	60	5.0 m				5/
2N1585	G	N			A	0.75	A	10	0	0.1	20	10 m		2.7		
2N1586	S	N	2N706A	2N706	A	0.125	A	10	0	0.25	5.0	1.0 m	4.0 B			
2N1587	S	N	2N2501	2N2501	A	0.125	A	20	0	0.25	5.0	1.0 m	4.0 B			
2N1588	S	N	2N2221	2N2218	A	0.125	A	40	0	0.25	5.0	1.0 m	4.0 B			
2N1589	S	N	2N835	2N834	A	0.125	A	10	0	0.25	20	1.0 m	4.0 B			
2N1590	S	N	2N2501	2N2501	A	0.125	A	20	0	0.25	20	1.0 m	4.0 B			
2N1591	S	N	2N2221	2N2218	A	0.125	A	40	0	0.25	20	1.0 m	4.0 B			
2N1592	S	N	2N2222	2N2218	A	0.125	A	10	0	0.25	40	1.0 m	4.0 B			
2N1593	S	N	2N2222	2N2218	A	0.125	A	20	0	0.25	40	1.0 m	4.0 B			
2N1594	S	N	2N2222	2N2218	A	0.125	A	40	0	0.25	40	1.0 m	4.0 B			
2N1595				TABLE7	THY											
THRU																
2N1604				TABLE7	THY											
2N1605	G	N			S	0.15	A	24	0	0.1	40	20 m	3.2 B	20		5/
2N1605A	G	N			S	0.2	A	40	U	0.1	40	20 m	3.2 B	20		5/
2N1606	S	P	2N3546	2N3546	SH	0.1	A	10	S	0.05	6.0	15 m	7.2 T			5/
2N1607	S	P	2N3546	2N3546	SH	0.1	A	10	S	0.05	6.0	15 m	10 T			5/
2N1608	S	P	2N3546	2N3546	SH	0.1	A	10	S	0.05	6.0	15 m	25 T			5/
2N1609	G	P	2N2140	2N2137	AP	4.5	C	60	0		30	100 m				37/
2N1610	G	P	2N2145	2N2137	AP	4.5	C	60	0		50	100 m				37/
2N1611	G	P	2N2138	2N2137	AP	4.5	C	40	0		30	100 m				37/
2N1612	G	P	2N2143	2N2137	AP	4.5	C	40	0		50	100 m				37/
★2N1613	S	N		2N718A	S	0.8	A	50	R		40	150 m	60 T			5/31
2N1613A	S	N	2N2218	2N2218	S	1.0	A	50	R		40	150 m	60 T			
2N1613B	S	N	2N3019	2N3019	S	1.0	A	55	R		40	150 m	60 T	10		
2N1614	G	P	2N1924	2N1924	S	0.24	A	40	R	0.3	18	20 m	0.4 B	60		
2N1615	S	N	2N3500	2N3498	AH	.0055	A	100	0		25	5.0 m	2.0 T			
2N1616	S	N	2N5477	2N5477	AHP	60	C	60	0	5.0	15	2.0 A	3.0 T			
2N1616A	S	N	2N5477	2N5477	AP	85	C	60	0	7.5	20	2.0 A	3.0 T			
2N1617	S	N	2N5477	2N5477	AHP	60	C	80	V	5.0	15	2.0 A	3.0 T			
2N1617A	S	N	2N5477	2N5477	AP	85	C	70	0	7.5	20	2.0 A	3.0 T			
2N1618	S	N	2N5479	2N5477	AHP	60	C	100	V	5.0	15	2.0 A	3.0 T			
2N1618A	S	N	2N5477	2N5477	AP	85	C	80	0	7.5	20	2.0 A	3.0 T			
2N1620	S	N	2N5458	2N5758	AHP	60	C	100	V	5.0	15	2.0 A	3.0 T			
2N1622	G	N			A	0.12	A	90	S		40	5.0 m				5/
2N1623	S	P	2N2906	2N2904	A	0.25	A	20	0	0.05	9.0	1.0 m	0.08 B			9/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N1624	G	N			S	0.15	A	20	R		60	30 m	4.0 B			40/
2N1631	G	P	2N3325	2N3323	AH	0.08	A			0.01						1/
2N1632	G	P	2N3325	2N3323	AH	0.08	A			0.01						40/
2N1633	G	P			AH	0.08	A			0.01						1/
2N1634	G	P			AH	0.08	A			0.01						40/
2N1635	G	P			AH	0.08	A			0.01						1/
2N1636	G	P			AH	0.08	A									1/
2N1637	G	P	2N3325	2N3323	AH	0.08	A			0.01						1/
2N1638	G	P	2N3325	2N3323	AH	0.08	A			0.01						1/
2N1639	G	P	2N3325	2N3323	AH	0.08	A			0.01						1/
2N1640	S	P	2N5230	2N5229	SC	0.25	A	20	U	0.05	6.0	100 *				1/
2N1641	S	P	2N5230	2N5229	SC	0.25	A	10	U	0.05	10	100 *				5/
2N1642	S	P			SC	0.25	A	6.0	U	0.05	15	100 *				5/
2N1643	S	P			A	0.25	A	25	U	0.05	10	100 *				5/
2N1644	S	N	2N2218	2N2218	S	2.0	C	40	R		40	150 m	50 T			
2N1645	G	P			AHP	1.0	A	20	O	0.3	20	0.2 A	450 T	13		38/
2N1646	G	N			SH	0.15	A	12	S	0.05	20	10 m		5.0		
2N1647	S	N	2N5477	2N5477	AHP	40	C	80	V	3.0	15	0.5 A	3.0 T			
2N1648	S	N	2N5479	2N5477	AHP	40	C	80	O	3.0	15	0.5 A	2.0 T			
2N1649	S	N	2N5477	2N5477	AHP	40	C	80	V	3.0	30	0.5 A	3.0 T			
2N1650	S	N	2N5477	2N5477	AHP	40	C	80	O	3.0	30	0.5 A	2.0 T			
★2N1651	G	P		2N1651	AP	100	C	60	S	25	35	10 A				41/161
★2N1652	G	P		2N1651	AP	100	C	100	S	25	35	10 A				41/161
★2N1653	G	P		2N1651	AP	100	C	120	S	25	35	10 A				41/161
2N1654	S	N	MM3006	MM3005	AP	0.25	A	80	O	0.05	20	1.0 m	0.08 B			5/
2N1655	S	N	MM3007	MM3005	AP	0.25	A	100	O	0.05	10	1.0 m	0.08 B			5/
2N1656	S	N	MM3007	MM3005	AP	0.25	A	100	O	0.05	20	1.0 m	0.08 B			5/
2N1657	S	N	MM3005	MM3005	AP			60	S	2.0	7.5	.85 A	1.6 B			
2N1660	S	N			AP	85	C	60	R	2.0	45	1.0 A	25 T			
2N1661	S	N			AP	85	C	80	R	2.0	45	1.0 A	25 T			
2N1662	S	N			AP	85	C	100	R	2.0	45	1.0 A	25 T			
2N1663	S	N			SH	0.15	A	15	O	0.1	30	20 m	100 T			9/
2N1664	G	P			A	0.2	A	40	R	0.2	45	10 m	0.08 B			5/
2N1665	G	P			AH	0.15	A	12	O	0.05	5.0	10 m	300 T	3.0		5/
2N1666	G	P	2N3616	2N3615	SP	30	C	60	V	8.0	15	6.0 A	0.03 E			3/
2N1667	G	P	2N3618	2N3615	SP	30	C	32	O	6.0	35	6.0 A	0.07 E		30k/75k	3/
2N1668	G	P	2N3616	2N3615	SP	30	C	32	O	6.0	20	6.0 A	0.04 E		30k/75k	3/
2N1669	G	P	2N3616	2N3615	SP	30	C	32	O	6.0	20	6.0 A	0.04 E		30k/75k	3/
2N1670	G	P			S	0.12	A				15	10 m				
2N1671				TABLE10	UJT											
2N1672	G	N			AL	0.12	A	40	X		20	1.0 m	1.6 B			5/
2N1672A	G	N			AL	0.12	A	40	X		20	1.0 m	1.6 B			5/
2N1673	G	P			AH	0.08	A			0.01						5/
2N1674	S	N			A	0.2	A	45	O	0.025			20 T			5/
2N1675	S	N			SHP	50	C	100	S	10	25	1.0 A	120 T			32/
2N1676	S	P			SC	0.1	A	4	U	0.05			16 T			5/
2N1677	S	P			SC	0.1	A	4	U	0.05			16 T			5/
2N1678	G	P			S	0.12	A	60	S		25	20 m	20 B			9/
2N1679	S	N	2N5335	2N5334	S	1.0	A	55	O	1.0	40	600 m	50 T	50	130/320	39/
2N1680	S	N	2N5334	2N5334	S	1.0	A	35	O	1.0	40	600 m	50 T	50	130/320	39/
2N1681	G	P			S	0.18	C	15	O	0.2	30	10 m	4.0 B	20		5/
2N1682	S	N			S	0.5	A	20	R		20	10 m	200 T	6.0		5/
2N1683	G	P			SH	0.15	A	12	O	0.1	50	40 m	50 T			5/
2N1684	G	P			S	0.1	A	25	X	0.1			3.2 B	20		
2N1685	G	P			S	0.1	A	20	R	0.2	60	30 m	6.4 B	20		
2N1686				TABLE7	THY											
THRU																
2N1689				TABLE7	THY											
2N1690	S	N	2N4912	2N4910	AP	40	C	80	O	0.5	20	500 m	1.8 E			
2N1691	S	N	2N5050	2N5050	AP	40	C	120	O	0.5	20	500 m	1.8 E			
★2N1692	G	P		2N1561	AH	0.35	A	15	O	0.25				10		102/24
★2N1693	G	P		2N1561	AH	0.35	A	25	S	0.25				10		102/24
2N1694	G	N			S	0.075	A	20	O	0.025	17	1.0 m	2.4 B	6.0		
2N1699	G	P			AH	0.1	A	40	X	0.01	20	1.5 m		3.0		
2N1700	S	N	2N4237	2N4237	S	5.0	C	60	V	1.0	20	100 m	0.32 B			5/
2N1701	S	N	2N4910	2N4910	S	25	C	60	V	2.5	20	300 m	0.28 B			8/
2N1702	S	N	2N5067	2N5067	S	75	C	60	V	5.0	15	800 m	0.24 B			
2N1703	S	N	2N5067	2N5067	S	75	C	60	V	5.0	15	800 m	0.24 B			36/
2N1704	S	N	2N2218	2N2218	S	0.5	A	45	B	0.05	50	1.0 m	4.0 B	15		5/
★2N1705	G	P		2N1705	A	0.2	A	12	R	0.4						5/31

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
★2N1706	G	P		2N1705	A	0.2	A	18	R	0.4	60	20 m				5/31
★2N1707	G	P		2N1705	A	0.2	A	25	R	0.4	30	10 m				5/31
★2N1708	S	N		2N1708	SH	1.0	C	12	0	0.2	20	10 m	200 T	6.0		46/
2N1708A	S	N			SH	0.3	A	20	R	0.5	30	10 m	300 T	6.0	40/75	46/
2N1709	S	N			AHP	15	C	30	0	2.0	7.5	.35 A	175 T	40		8/
2N1710	S	N		2N718A	AHP	15	C	30	0	2.0	4.0	.35 A	140 T	40		8/
2N1711	S	N			S	0.8	A	50	R	1.0	100	150 m	70 T	25		5/
2N1711A	S	N	2N2219A	2N2218	AH	1.0	A	50	R		100	150 m	70 T			
2N1711B	S	N	2N2219A	2N2218	AH	1.0	A	55	R	2.0	100	150 m	70 T	10		5/
2N1713	G	P				0.08	A	12	0	0.01	20	1.5 m	80 B	3.1		7/
2N1714	S	N	2N4237	2N4237	AP	20	C	60	0	0.75	20	200 m	16 T	50		5/
2N1715	S	N	2N5681	2N5681	AP	20	C	100	0	0.75	20	200 m	16 T	50		5/
2N1716	S	N	2N4237	2N4237	AP	20	C	60	0	0.75	40	200 m	16 T	50		5/
2N1717	S	N	2N5681	2N5681	AP	20	C	100	0	0.75	40	200 m	16 T	50		5/
2N1718	S	N	2N3766	2N3766	AP	20	C	60	0	0.75	20	200 m	16 T	50		
2N1719	S	N	2N3767	2N3766	AP	20	C	100	0	0.75	20	200 m	16 T	50		
2N1720	S	N	2N3766	2N3766	AP	20	C	60	0	0.75	40	200 m	16 T	50		
2N1721	S	N	2N3767	2N3766	AP	20	C	100	0	0.75	40	200 m	16 T	50		
2N1722	S	N	2N5427	2N5427	AP	50	C	80	0	5.0	20	2.0 A	10 T	550		
2N1722A	S	N	2N1724	2N1724	AP	50	C	120	0		30	2.0 A	10 T			
2N1723	S	N	2N1724	2N1724	AP	50	C	80	0	5.0	50	2.0 A	10 T			
★2N1724	S	N		2N1724	AP	50	C	80	0	5.0	20	2.0 A	10 T	550		53/
2N1724A	S	N	2N1724A	2N1724	AP	50	C	120	0		30	2.0 A	10 T			61/9
★2N1725	S	N		2N1724	AP	50	C	80	0	5.0	50	2.0 A	10 T	550		61/9
2N1726	G	P	2N3323	2N3323	AH	0.06	A	20	S	0.05	50	1.0 m	100 T			9/
2N1727	G	P	2N3324	2N3323	AH	0.06	A	20	S	0.05	20	1.0 m	100 T			9/
2N1728	G	P	2N3324	2N3323	AH	0.06	A	20	S	0.05	20	1.0 m	100 T			9/
2N1729	G	P			S	0.15	A	15	X	0.3	30	100 m		20	300/600	5/
2N1730	G	N			S	0.15	A	15	X	0.3	30	100 m		20	300/600	5/
2N1731	G	P			A	0.15	A	30	X	0.3	40	10 m	40 B	20		5/
2N1732	G	N			A	0.15	A	30	X	0.3	40	10 m	4.0 B	20		5/
★2N1742	G	P		2N499	AH	0.06	A	20	S	0.05	10	2.0 m		1.5		9/
2N1743	G	P	2N3284	2N3283	AH	0.06	A	20	S	0.05	10	2.0 m		1.5		9/
2N1744	G	P	2N3284	2N3283	AH	0.06	A	20	S	0.05	10	2.0 m		1.5		9/
2N1745	G	P	2N3285	2N3283	AH	0.06	A	20	S	0.05	10	2.0 m				9/
2N1746	G	P	2N3323	2N3323	AH	0.06	A	20	S	0.05	10	1.0 m	100 T	3.0		9/
2N1747	G	P	2N3324	2N3323	AH	0.06	A	20	S	0.05	10	1.0 m				9/
2N1748	G	P	2N3324	2N3323	AH	0.06	A	25	S	0.05			80 T			9/
2N1748A	G	P	2N3323	2N3323	AH	0.06	A	25	S	0.05			100 T			9/
2N1749	G	P	2N3323	2N3323	AH	0.75	A	40	S	0.01			80 T	2.5		9/
2N1750	G	P			A	0.015	A	6	S	0.005	18	500 *	30 M	6.0		24/
2N1751	G	P			AP			80	S	25	30	20 A	1.2 B			3/
2N1752	G	P	2N3325	2N3323	A	0.06	A	12	S	0.05			50 M	3.0		9/
2N1753	G	P			AH	0.03	A	18	0	0.05	50	100 *		2.5		1/
2N1754	G	P			SH	0.05	A	13	S	0.1	20	10 m				9/
2N1755	G	P	2N2137	2N2137	SP	28	C	35	S	3.0	30	0.5 A	0.45 E			
2N1756	G	P	2N2138	2N2137	SP	28	C	50	S	3.0	30	0.5 A				
2N1757	G	P	2N2139	2N2137	SP	28	C	65	S	3.0	30	0.5 A	0.45 E			
2N1758	G	P	2N2140	2N2137	SP	28	C	75	S	3.0	30	0.5 A	0.45 E			
2N1759	G	P	2N2142	2N2137	SP	28	C	35	S	3.0	60	0.5 A	0.9 E			
2N1760	G	P	2N2143	2N2137	SP	28	C	50	S	3.0	60	0.5 A	0.9 E			
2N1761	G	P	2N2144	2N2137	SP	28	C	65	S	3.0	60	0.5 A	0.9 E			
2N1762	G	P	2N2145	2N2137	SP	28	C	75	S	3.0	60	0.5 A	0.9 E			
2N1763	S	N			S	0.3	A	25	0	0.05					32/58	51/
2N1764	S	N	2N2369A	2N2369A	S	0.3	A	15	0	0.05					32/58	51/
2N1765				TABLE7	THY											
2N1768	S	N	2N4231	2N4231	S	40	C	40	0	3.0	35	750 m	0.48 B			
2N1769	S	N	2N4233	2N4231	S	40	C	55	0	3.0	35	750 m	0.48 B			
2N1770				TABLE7	THY											
THRU																
2N1778				TABLE7	THY											
2N1779	G	P			S	0.1	A	20	R		20	30 m				
2N1780	S	P	2N3798	2N3798	S	0.1	A	25	R		30	30 m	3.2 B			
2N1781	G	P			S	0.1	A	25	X		40	20 m	3.2 B			
2N1782	G	P			S	0.1	A	20	X		30	10 m	4.0 B			
2N1783	G	P			S	0.1	A	15	0		20	10 m	4.0 B			
2N1784	G	P			S	0.1	A	20	0		20	10 m	8.0 B			
2N1785	G	P	2N3324	2N3323	AH	0.045	A	10	S	0.05	40	1.0 m	50 T	3.0		9/
2N1786	G	P	2N3323	2N3323	AH	0.045	A	10	S	0.05	15	1.0 m	50 T	3.0		9/
2N1787	G	P	2N3324	2N3323	AH	0.045	A	15	S	0.05	20	1.0 m	50 T	3.0		9/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N1788	G	P	2N3324	2N3323	AH	0.05	A	35	S	0.05	40	1.0 m	100 T	2.5		9/
2N1789	G	P	2N3325	2N3323	AH	0.06	A	35	S	0.05	15	1.0 m	100 T	2.5		9/
2N1790	G	P	2N3323	2N3323	AH	0.06	A	35	S	0.05	25	1.0 m	100 T	2.5		9/
2N1792				TABLE7	THY											
THRU																
2N1807				TABLE7	THY											
2N1808	G	N			S	0.15	A	25	B	0.3			3.2 B	20		5/
2N1809	S	N	2N5885	2N5883	SP	250	C	50	V		10	10 A				
2N1810	S	N	2N5629	2N5629	SP	250	C	100	V		10	10 A				
2N1811	S	N	2N5629	2N5629	SP	250	C	150	V		10	10 A				
2N1812	S	N			SP	250	C	200	V		10	10 A				
2N1813	S	N			SP	250	C	250	V		10	10 A				
2N1814	S	N			SP	250	C	300	V		10	10 A				
2N1816	S	N	2N5302	2N5301	SP	250	C	50	V		10	15 A				
2N1817	S	N	2N5302	2N5301	SP	250	C	100	V		10	15 A				
2N1818	S	N			SP	250	C	150	V		10	15 A				
2N1819	S	N			SP	250	C	200	V		10	15 A				
2N1820	S	N			SP	250	C	250	V	30	10	15 A			20k/25k	
2N1821	S	N			SP	250	C	300	V	30	10	15 A			20k/25k	
2N1823	S	N	2N5685	2N5685	SP	250	C	50	V		10	20 A				
2N1824	S	N	2N5686	2N5685	SP	250	C	100	V		10	20 A				
2N1825	S	N			SP	250	C	150	V		10	20 A				
2N1826	S	N			SP	250	C	200	V		10	20 A				
2N1827	S	N			SP	250	C	250	V	30	10	20 A			20k/25k	
2N1828	S	N			SP	250	C	300	V	30	10	20 A			20k/25k	
2N1830	S	N	2N5685	2N5685	SP	250	C	50	V		10	25 A				
2N1831	S	N	2N5686	2N5685	SP	250	C	100	V		10	25 A				
2N1832	S	N			SP	250	C	150	V		10	25 A				
2N1833	S	N			SP	250	C	200	V		10	25 A				
2N1834	S	N			SP	250	C	250	V	30	10	25 A			20k/25k	
2N1835	S	N			SP	250	C	300	V	30	10	25 A			20k/25k	
2N1837	S	N	2N2218	2N2218	SH	0.8	A	30	0	0.5	40	150 m	140 T	18	200/500	5/
2N1837A	S	N	2N2218	2N2218	SH	0.8	A	30	0	0.5	40	.15 A	140 T	18	200/500	5/
2N1837B	S	N	2N2218	2N2218	SH	0.8	A	30	0		40	.15 A	140 T			
2N1838	S	N	2N2218	2N2218	SH	0.6	A	20	0	0.5	40	0.1 A	90 T	27	200/800	5/
2N1839	S	N	2N2218	2N2218	SH	0.6	A	20	0	0.5	12	0.1 A	90 T	27	200/600	5/
2N1840	S	N	2N2218	2N2218	SH	0.6	A	15	0	0.5	10	.15 A	90 T	27		5/
2N1841	S	N	2N5334	2N5334	AHP	2.0	A	50	0	2.0	15	15 m	900 E	40		
2N1842				TABLE7	THY											
THRU																
2N1850				TABLE7	THY											
2N1853	G	P			SH	0.15	A	6	0	0.1	30	6.0 m			800/900	5/
2N1854	G	P			SH	0.15	A	6	0	0.1	40	20 m	40 T	12	60/80	5/
2N1864	G	P	2N3324	2N3323	AH	0.06	A	20	S		10	1.0 m	50 M	3.0	/80	9/
2N1865	G	P	2N3325	2N3323	AH	0.06	A	20	S	0.05	25	1.0 m		3.0		9/
2N1866	G	P	2N3323	2N3323	AH	0.06	A	35	S	0.05	25	1.0 m		2.5		9/
2N1867	G	P	2N3324	2N3323	AH	0.06	A	35	S	0.05	10	1.0 m				9/
2N1868	G	P	2N3325	2N3323	AH	0.06	A	20	S	0.05	10	2.0 m		1.5		9/
2N1869				TABLE7	THY											
THRU																
2N1885				TABLE7	THY											
2N1886	S	N	2N4911	2N4910	AHP	20	C	60	0	3.0	20	0.5 A	2.0 T			
2N1889	S	N	2N3498	2N3498	AH	0.8	A	80	R		40	150 m	50 T	15		5/
2N1890	S	N	2N3499	2N3498	AH	0.8	A	80	R		100	150 m	60 T	15		5/
2N1891	G	N			SH	0.15	A	15	0	0.3	25	100 m	4.0 B	20		5/
2N1892	G	P			S	0.15	A	15	0	0.3	40	10 m	4.0 B	20		5/
★2N1893	S	N		2N1893	AH	0.8	A	100	R	0.5	40	150 m	50 T	15		5/31
2N1893A	S	N	2N3498	2N3498	AHP	0.8	A	80	0	0.5	40	.15 A	100 T	8.0		5/
2N1894	S	N	2N4238	2N4237	AP			60	R	2.0	12	1.0 A				
2N1895	S	N	2N4239	2N4237	AP			80	R	2.0	12	1.0 A				
2N1896	S	N	2N5336	2N5336	AP			60	R	2.0	45	1.0 A	25 T			
2N1897	S	N	2N5336	2N5336	AP			80	R	2.0	45	1.0 A	25 T			
2N1898	S	N	2N5338	2N5336	AP			100	R	2.0	45	1.0 A	25 T			
2N1899	S	N			SHP	125	C	50	0	10	10	10 A	50 T	1000	1000/3500	
2N1900	S	N			AHP	125	C	50	0	10	8.0	10 A	50 T	1000	500/3500	
2N1901	S	N			SHP	125	C	50	0	10	20	10 A	50 T	1000	1000/3500	
2N1902	S	N			SHP	125	C	50	0	10	10	10 A	50 T			
2N1903	S	N			AHP	125	C	50	0	10	8.0	10 A	50 T	1000		
2N1904	S	N			SHP	125	C	50	0	10	20	10 A	50 T	1000	500/3500	3/
2N1905	G	P	2N2832	2N2832	AP	30	C	50	0	6.0	50	1.0 A				3/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N1906	G	P	2N2832	2N2832	AP	30	C	60	0	6.0	75	1.0 A				3/
2N1907	G	P			AHP	60	C	40	0	20			10 T			3/
2N1907A	G	P			AHP	60	C	40	0	20	30	10 A				3/
2N1908	G	P			AHP	60	C	50	0				10 T			
2N1908A	G	P			AHP	60	C	50	0	20	30	10 A				3/
2N1909				TABLE7	THY											
THRU																
2N1916				TABLE7	THY											
2N1917	S				SC	0.25	A	8	0	0.05			16 T	14		5/
2N1918	S				SC	0.25	A	8	0	0.05			10 T	14		5/
2N1919	S				SC	0.25	A	18	0	0.05			0.08 B	14		5/
2N1920	S				SC	0.25	A	18	0	0.05			0.08 B	14		5/
2N1921	S				SC	0.25	A	50	0	0.05			0.08 B	14		5/
2N1922	S				SC	0.25	A	80	0	0.05			0.08 B	14		5/
2N1923	S		2N3498	2N3498	A	0.75	A	85	0	0.06	4.0			15		11/
★2N1924	G			2N1924	A	0.225	A	40	R	0.5	34	20 m	0.08 B	30		5/31
★2N1925	G			2N1924	A	0.225	A	40	R	0.5	53	20 m	1.04 B	30		5/31
★2N1926	G			2N1924	A	0.225	A	40	R	0.5	72	20 m	1.2 B	30		5/31
2N1929				TABLE7	THY											
THRU																
2N1935				TABLE7	THY											
2N1936	S	N	MJ7000	MJ7000	AP	150	C	60	0		7.0	10 A	4.0 T			
2N1937	S	N	MJ7000	MJ7000	AP	150	C	80	0		7.0	10 A	4.0 T			
2N1940	G	P			AHP	3.5	C	15	0	0.25	5.0	40 m		12		
2N1941	S	N	2N2219A	2N2218	A	0.6	A	30	R	1.0	30	10 m	60 T	35		
2N1942	G	P			S	0.2	A	10	0	0.5	20	0.2 A	4.0 B	20		5/
2N1943	S	N	2N3020	2N3019	A	0.8	A	60	0		30	200 m				5/
2N1944	S	N	2N2219A	2N2218	S	0.6	A	20	R	1.0	150	1.0 m	60 T	40		5/
2N1945	S	N	2N2219A	2N2218	S	0.6	A	30	R	1.0	150	1.0 m	60 T	40		5/
2N1946	S	N	2N2219A	2N2218	S	0.6	A	40	R	1.0	150	1.0 m	60 T	40		5/
2N1947	S	N			S	0.6	A	20	R	1.0	500	0.1 A	60 T	40		5/
2N1948	S	N			S	0.6	A	30	R	1.0	500	0.1 A	60 T	40		5/
2N1949	S	N			S	0.6	A	40	R	1.0	500	0.1 A	60 T	40		5/
2N1950	S	N			S	0.6	A	20	R	1.0	250	0.1 A	60 T	40		5/
2N1951	S	N			S	0.6	A	30	R	1.0	250	0.1 A	60 T	40		5/
2N1952	S	N			S	0.6	A	40	R	1.0	250	0.1 A	60 T	40		5/
2N1953	S	N	2N2218	2N2218	A	0.6	A	20	S	1.0	15	10 m	40 T	35		5/
2N1954	G	P	2N651	2N650	S	0.2	A	20	0	0.2	30	20 m			2750/6250	5/
2N1955	G	P	2N1190	2N1189	S	0.2	A	18	0	0.2	50	20 m			2750/6250	5/
2N1956	G	P	2N651	2N650	S	0.2	A	16	0	0.2	30	20 m			2750/6250	5/
2N1957	G	P	2N1187	2N1175	S	0.2	A	14	0	0.2	30	20 m			2750/6250	5/
2N1958	S	N	2N2537	2N2537	SH	0.6	A	40	R	0.5	20	150 m	100 T	18		5/
2N1958A	S	N	2N2537	2N2537	SH	0.6	A	40	R	1.0	20	150 m	100 T	14		5/
2N1959	S	N		2N1959	SH	0.6	A	40	R	0.5	40	150 m		18		
2N1959A	S	N	2N2537	2N2537	SH	0.6	A	40	R	1.0	40	150 m	100 T	14		5/
2N1960	G	P			SH	0.15	A	15		0.2	25	10 m				
2N1961	G	P			SH	0.15	A	12	S	0.2	20	10 m				
2N1962	S	N	2N2537	2N2537	SH	0.4	A	20	R	0.2	20	10 m	200 T	3.0		
2N1963	S	N	2N2537	2N2537	SH	0.4	A	15	R	0.2	25	10 m	200 T	3.5		
2N1964	S	N	2N2539	2N2537	SH	0.4	A	40	R	0.4	20	150 m	100 T	18		
2N1965	S	N	2N2539	2N2537	SH	0.4	A	40	R	0.5	40	.15 A	100 T	18		
2N1966	G	P			AL	0.12	A	15	R	0.2						
2N1967	G	P			AL	0.12	A	15	R	0.2						5/
2N1968	G	P			AL	0.12	A	18	R	0.2						5/
2N1969	G	P			S	0.15	A	15	0	0.4	50	200 *	8.0 B	20		5/
★2N1970	G	P		2N1970	AP	150	C	50	B	15	17	5.0 A	0.085 E			
2N1971	G	P	2N3616	2N3615	AP			40	0		25	0.5 A	0.375 E			36/5
2N1972	S	N	2N2219	2N2218	AH	0.6	A	30	R		110	50 m	50 T	35		36/
2N1973	S	N	2N2219	2N2218	A	0.8	A	80	R		75	10 m	60 T			5/
2N1974	S	N	2N3498	2N3498	A	0.8	A	80	R		35	10 m	50 T	15		
2N1975	S	N	2N3498	2N3498	A	0.8	A	80	R		15	10 m	40 T			5/
2N1978	S	N			AHP	30	C	40	R		20	500 m	40 T	85		5/
★2N1980	G	P		2N1970	AP	170	C	30	0	15	50	5.0 A	0.15 E			
★2N1981	G	P		2N1970	AP	170	C	40	0	15	50	5.0 A	0.15 E			36/5
★2N1982	G	P		2N1970	AP	170	C	50	0	15	50	5.0 A	0.15 E			36/5
★2N1983	S	N		2N1983	A	0.6	A	25	0	1.0			40 T	45		36/5
★2N1984	S	N		2N1983	A	0.6	A	25	0	1.0			40 T	45		5/
2N1985	S	N	2N2218	2N2218	A	0.6	A	25	0				40 T	45		5/
2N1986	S	N	2N2219	2N2218	AH	0.6	A	25	0		60	150 m	40 T			
2N1987	S	N	2N2218	2N2218	AH	0.6	A	25	0		20	150 m	40 T			5/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N1988	S	N	2N2218A	2N2218	AH	0.6	A	45	0		35	30 m	40 T	20		5/
2N1989	S	N	2N2218A	2N2218	AH	0.6	A	45	0		20	30 m	40 T			5/
★2N1990	S	N		2N1990	SP	0.6	A	100	B	1.0	20	30 m				39/79
★2N1991	S	P		2N1131	AH	0.6	A	20	0	0.6	15	150 m	40 T	45		5/31
2N1992	S	N	2N2221	2N2218	SH	0.35	A	15	0	0.05	30	1.0 m	300 T	6.0		18/
2N1993	G	N			S	0.15	A	18	0	0.3	50	10 m	2.4 B	20		5/
2N1994	G	N			S	0.15	A	15	0	0.3	15	10 m	2.4 B	20	1500/1800	5/
2N1995	G	N			S	0.15	A	15	0	0.3	25	10 m	4.0 B	20	1300/1800	5/
2N1996	G	N			S	0.15	A	15	0	0.3	35	10 m	6.4 B	20	1100/1800	5/
2N1997	G	P			S	0.25	A	15	0	0.5	40	100 m	2.4 B	20	360/1150	5/
2N1998	G	P			S	0.25	A	15	0	0.5	70	100 m	5.6 T	20	310/1080	5/
2N1999	G	P			S	0.25	A	15	0	0.5	100	100 m	10 T	20	235/935	5/
2N2000	G	P			S	0.3	A	15	0	1.0	50	100 m	1.6 B	35	820/1400	5/
2N2001	G	P			S	0.3	A	15	0	1.0	100	100 m	4.8 B	35	700/1300	5/
2N2002	S	P	2N5230	2N5229	SC	0.25	A	5	0							
2N2003	S	P	2N5230	2N5229	SC	0.25	A	5	0							
2N2004	S	P	2N5231	2N5229	SC	0.25	A	15	0	0.1	12	1.0 m	0.4 B			5/
2N2005	S	P	2N5231	2N5229	SC	0.25	A	15	0							
2N2006	S	P			SC	0.25	A	35	0							
2N2007	S	P			SC	0.25	A	35	0							
2N2008	S	N	2N3500	2N3498	A	0.8	A	110	0	0.5	30	10 m	40 T	15		5/
2N2009				TABLE7	THY											
2N2014				TABLE7	THY											
2N2015	S	N	2N5881	2N5879	A	150	C	50	0	10	15	5.0 A	0.18 E	400		36/
2N2016	S	N	2N5882	2N5879	A	150	C	65	0	10	15	5.0 A	0.18 E	400		36/
2N2017	S	N	2N2405	2N1893	A	1.0	A	60	0	1.0	50	200 m				
2N2018	S	N	2N5051	2N5050	AHP	20	C	150	V	2.0	20	0.5 A	2.0 T			
2N2019	S	N	2N5052	2N5050	AHP	20	C	200	V	2.0	20	0.5 A	2.0 T			
2N2020	S	N	2N5050	2N5050	AHP	20	C	125	0	2.0	40	0.5 A	3.0 T			
2N2021	S	N	2N5051	2N5050	AHP	20	C	140	0	2.0	40	0.5 A	3.0 T			
2N2022	G	P			SH	0.15	A	12	S	0.05	25	10 m	250 T	8.0	60/100	28/
2N2023				TABLE7	THY											
2N2031				TABLE7	THY											
2N2032	S	N	2N4232	2N4231	AHP	45	C	45	0	5.0	20	2.0 A	3.0 T			
2N2033	S	N	2N4238	2N4237	SP	5.0	C	60	0	3.0	20	500 m	1.0 T		1000/1500	5/
2N2034	S	N	2N5334	2N5334	SP	14	C	60	0	3.0	20	1.0 A	1.0 T		1000/1500	5/
2N2035	S	N	2N4232	2N4231	SP	17	C	60	0	3.0	20	1.5 A	1.0 T		1000/1500	8/
2N2036	S	N	2N4232	2N4231	SP	17.5	C	60	0	3.0	20	2.0 A	1.0 T		1000/1500	37/
2N2038	S	N	2N4237	2N4237	AH	0.6	A	45	0		12	0.2 A	2.0 T			
2N2039	S	N	2N4238	2N4237	AH	0.6	A	75	0		12	0.2 A	2.0 T			
2N2040	S	N	2N4237	2N4237	AH	0.6	A	45	0		30	0.2 A	2.0 T			
2N2041	S	N	2N4238	2N4237	AH	0.6	A	75	0		30	0.2 A	2.0 T			
★2N2042,A	G	P		2N2042	A	0.2	A	105	S	0.2	20	5.0 m	0.4 B	25		5/31
★2N2043,A	G	P		2N2042	A	0.2	A	105	S	0.2	40	5.0 m	0.6 B	25		5/31
2N2044				TABLE7	THY											
2N2047				TABLE7	THY											
2N2048	G	P	2N2955	2N2955	SH	0.15	A	15	0	0.1	50	10 m	150 T	3.0	60/60	9/
2N2048A	G	P		2N2955	SH	0.15	A	20	0	0.1	50	10 m	0.375 E	3.0	35/145	9/
2N2049	S	N	2N2219A	2N2218	A	0.8	A	50	R	0.5	100	150 m	50 T	25		5/
2N2059	G	P			S	0.06	A	8	S	0.05	20	10 m	50 T	5.0	8/25	1/
★2N2060	S	N		2N2060	AM	0.5	A	80	R	0.5	50	10 m	60 T	15		78/654
★2N2060A	S	N		2N2060	AM	0.5	A	60	0	0.5	50	10 m	60 T	15		78/654
2N2060B	S	N						100	B	0.5						
2N2061	G	P			S	40	C	10	0	3.0	10	0.5 A	0.02 E			3/
2N2061A	G	P			SP	90	C	15	0	5.0	20	2.0 A	0.1 E			3/
2N2062	G	P			S	40	C	10	0	3.0	20	2.0 A	0.04 E			3/
2N2062A	G	P			SP	90	C	15	0	5.0	50	2.0 A	0.05 E			3/
2N2063	G	P			S	35	C	15	0	3.0	10	2.0 A	0.02 E			3/
2N2063A	G	P			SP	90	C	20	0	5.0	20	2.0 A	0.1 E			3/
2N2064	G	P			S	35	C	15	0	3.0	20	2.0 A	0.04 E			3/
2N2064A	G	P			SP	90	C	20	0	5.0	50	2.0 A	0.05 E			3/
2N2065	G	P			S	35	C	25	0	3.0	10	2.0 A	0.02 E			3/
2N2065A	G	P			SP	90	C	40	0	5.0	20	2.0 A	0.1 E			3/
2N2066	G	P			S	35	C	25	0	3.0	20	2.0 A	0.04 E			3/
2N2066A	G	P			SP	90	C	40	0	5.0	50	2.0 A	0.05 E			3/
2N2067	G	P	2N1536	2N1529	S	28	C	25	0	3.0	20	0.5 A	0.14 E			
2N2068	G	P	2N1531	2N1529	S	28	C	55	0	3.0	20	0.5 A	0.14 E			

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N2069	G	P	2N1539	2N1539	S	70	C	30	S	12	30	5.0 A	0.045 E			
2N2070	G	P	2N1541	2N1539	S	70	C	60	S	12	30	5.0 A	0.045 E			3/
2N2071	G	P	MP1539		S	70	C	30	S	12	30	5.0 A	0.045 E			3/
2N2072	G	P	MP1541		S	70	C	60	S	12	30	5.0 A	0.045 E			3/
2N2074				TABLE7	THY											
★2N2075	G	P		2N2075	AP	170	C	80	S	15	20	5.0 A	0.1 E			36/5
★2N2075A	G	P		2N2075	AP	170	C	80	S	15	20	5.0 A	0.1 E			36/5
★2N2076	G	P		2N2075	AP	170	C	70	S	15	20	5.0 A	0.1 E			36/5
★2N2076A	G	P		2N2075	AP	170	C	70	S	15	20	5.0 A	0.1 E			36/5
★2N2077	G	P		2N2075	AP	170	C	50	S	15	20	5.0 A	0.1 E			36/5
★2N2077A	G	P		2N2075	AP	170	C	50	S	15	20	5.0 A	0.1 E			36/5
★2N2078	G	P		2N2075	AP	170	C	40	S	15	20	5.0 A	0.1 E			36/5
★2N2078A	G	P		2N2075	AP	170	C	40	S	15	20	5.0 A	0.1 E			36/5
★2N2079	G	P		2N2075	AP	170	C	80	S	15	35	5.0 A	0.175 E			36/5
★2N2079A	G	P		2N2075	AP	170	C	80	S	15	35	5.0 A	0.175 E			36/5
★2N2080	G	P		2N2075	AP	170	C	70	S	15	35	5.0 A	0.175 E			36/5
★2N2080A	G	P		2N2075	AP	170	C	70	S	15	35	5.0 A	0.175 E			36/5
★2N2081	G	P		2N2075	AP	170	C	50	S	15	35	5.0 A	0.175 E			36/5
★2N2081A	G	P		2N2075	AP	170	C	50	S	15	35	5.0 A	0.175 E			36/5
★2N2082	G	P		2N2075	AP	170	C	40	S	15	35	5.0 A	0.175 E			36/5
★2N2082A	G	P		2N2075	AP	170		40	S	15	35	5.0 A	0.175 E			36/5
2N2083	G	P			A	0.06	A	30	B	0.01	25	1.0 m	30 T	3.2		7/
2N2084	G	P			AH	0.125	A	20	O	0.01	40	1.0 m		4.0		33/
2N2085	G	N			A	0.15	A	23	X		50	10 m	4.8 T			5/
2N2086	S	N	2N3020	2N3019	SH	0.6	A	80	R	0.5	20	150 m	150 T	12		5/
2N2087	S	N	2N3020	2N3019	SH	0.6	A	80	R	0.5	40	150 m	150 T	12	85/155	5/
2N2089	G	P			AH	0.1	A	20	R	0.01	40	1.0 m	44 T	4.0		7/
2N2090	G	P			AH	0.1	A	20	R	0.01	40	1.0 m	44 T	4.0		7/
2N2091	G	P			AH	0.1	A	20	R	0.01	40	1.0 m	44 T			7/
2N2092	G	P			AH	0.1	A	20	R	0.01	40	1.0 m	44 T			7/
2N2093	G	P			AH	0.1	A	25	R	0.01	40	1.0 m	30 T			7/
2N2095	G	P			AHP	1.0	A	15	O	0.3			500 T	8.0		31/
★2N2096	G	P		2N1204	SH	0.25	A	12	O	0.5	15	400 m		20	35/130	31/
★2N2097	G	P		2N1204	SH	0.25	A	20	O	0.5	20	400 m		20	20/90	31/
2N2098	G	P			AH	1.0	A	15	O	0.3			500 B	8.0		9/
★2N2099	G	P		2N1204	SH	0.25	A	12	O	0.5	15	400 m		20	35/130	9/
★2N2100	G	P		2N1204	SH	0.25	A	20	O	0.5	20	400 m		20	20/90	9/
2N2100A	G	P		2N1204	SH	0.3	A	20	O	0.5	20	400 m		20	20/90	9/
2N2101	S	N	2N4912	2N4912	AP	75	C	40	O		15	1.0 A	0.025 T			
2N2102	S	N			SH	5.0	C	80	R	1.0	35	10 m		15		5/
2N2102A	S	N	2N5334	2N5334	SH	1.0	A	65	O	1.0	40	150 m	60 T	15		5/
2N2104	S	P	2N3052	2N3052	SH	3.0	C	35	O	0.6	25	150 m	60 T			5/
2N2105	S	P	2N3052	2N3052	SH	3.0	C	35	O		15	150 m	50 T			5/
2N2106	S	N	2N4238	2N4237	A	1.0	A	60	R	0.5	12	200 m				5/
2N2107	S	N	2N4238	2N4237	A	1.0	A	60	R	0.5	30	200 m				5/
2N2108	S	N	2N5681	2N5681	A	1.0	A	60	R	0.5	75	200 m				5/
2N2109	S	N	2N5885	2N5883	SP	250	C	50	V	30	10	10 A			20k/25k	
2N2110	S	N	2N5629	2N5629	SP	250	C	100	V	30	10	10 A			20k/25k	
2N211U	S	N	2N5631	2N5629	SP	250	C	150	V	30	10	10 A			20k/25k	
2N2112	S	N			SP	250	C	200	V	30	10	10 A			20k/25k	
2N2113	S	N			SP	250	C	250	V	30	10	10 A			20k/25k	
2N2114	S	N			SP	250	C	300	V	30	10	10 A			20k/25k	
2N2117	S	N			SP	250	C	100	V	30	10	15 A			20k/25k	
2N2118	S	N			SP	250	C	150	V	30	10	15 A			20k/25k	
2N2119	S	N			SP	250	C	200	V	30	10	15 A			20k/25k	
2N2120	S	N			SP	250	C	250	V	10	10	15 A			20k/25k	
2N2121	S	N			SP	250	C	300	V	10	10	15 A			20k/25k	
2N2123	S	N			SP	250	C	50	V	30	10	20 A			20k/25k	
2N2124	S	N			SP	250	C	100	V	30	10	20 A			20k/25k	
2N2125	S	N			SP	250	C	150	V	30	10	20 A			20k/25k	
2N2126	S	N			SP	250	C	200	V	30	10	20 A			20k/25k	
2N2127	S	N			SP	250	C	250	V	10	10	20 A			20k/25k	
2N2128	S	N			SP	250	C	300	V	10	10	20 A			20k/25k	
2N2130	S	N			SP	250	C	50	V	30	10	25 A			20k/25k	
2N2131	S	N			SP	250	C	100	V	30	10	25 A			20k/25k	
2N2132	S	N			SP	250	C	150	V	30	10	25 A			20k/25k	
2N2133	S	N			SP	250	C	200	V	30	10	25 A			20k/25k	
2N2134	S	N			SP	250	C	250	V	10	10	25 A			20k/25k	
2N2135	S	N			SP	250	C	300	V	10	10	25 A			20k/25k	
★2N2137	G	P		2N2137	AP	62.5	C	30	S	3.0	30	0.5 A	0.36 E			3/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
★2N2137A	G	P		2N2137	AP	62.5	C	20	0	3.0	30	0.5 A	0.36 E			3/
★2N2138	G	P		2N2137	AP	62.5	C	45	S	3.0	30	0.5 A	0.36 E			3/
★2N2138A	G	P		2N2137	AP	62.5	C	30	0	3.0	30	0.5 A	0.36 E			3/
★2N2139	G	P		2N2137	AP	62.5	C	60	S	3.0	30	0.5 A	0.36 E			3/
★2N2139A	G	P		2N2137	AP	62.5	C	45	0	3.0	30	0.5 A	0.36 E			3/
★2N2140	G	P		2N2137	AP	62.5	C	75	S	3.0	30	0.5 A	0.36 E			3/
★2N2140A	G	P		2N2137	AP	62.5	C	60	0	3.0	30	0.5 A	0.36 E			3/
★2N2141	G	P		2N2137	AP	62.5	C	90	S	3.0	30	0.5 A	0.36 E			3/
★2N2141A	G	P		2N2137	AP	62.5	C	65	0	3.0	30	0.5 A	0.36 E			3/
★2N2142	G	P		2N2137	AP	62.5	C	30	S	3.0	50	0.5 A	0.6 E			3/
★2N2142A	G	P		2N2137	AP	62.5	C	20	0	3.0	50	0.5 A	0.6 E			3/
★2N2143	G	P		2N2137	AP	62.5	C	45	S	3.0	50	0.5 A	0.6 E			3/
★2N2143A	G	P		2N2137	AP	62.5	C	30	0	3.0	50	0.5 A	0.6 E			3/
★2N2144	G	P		2N2137	AP	62.5	C	60	S	3.0	50	0.5 A	0.6 E			3/
★2N2144A	G	P		2N2137	AP	62.5	C	45	0	3.0	50	0.5 A	0.6 E			3/
★2N2145	G	P		2N2137	AP	62.5	C	75	S	3.0	50	0.5 A	0.6 E			3/
★2N2145A	G	P		2N2137	AP	62.5	C	60	0	3.0	50	0.5 A	0.6 E			3/
★2N2146	G	P		2N2137	AP	62.5	C	90	S	3.0	50	0.5 A	0.6 E			3/
★2N2146A	G	P		2N2137	AP	62.5	C	65	0	3.0	50	0.5 A	0.6 E			3/
2N2147	G	P	2N3617	2N3615	AP	12.5	C	50	0		100	1.0 A	3.0 T			
2N2148	G	P	2N3615	2N3615	AP	12.5	C	40	0		40	1.0 A	2.0 T			
2N2150	S	N	2N5477	2N5477	AHP	30	C	80	0	2.0	20	1.0 A	10 T	160		
2N2151	S	N	2N5477	2N5477	AHP	30	C	80	0	2.0	40	1.0 A	10 T	160		
★2N2152	G	P		2N2152	AP	170	C	45	S	30	50	5.0 A	0.1 E			36/5
2N2152A	G	P			AP	170	C	30	0	30	50	5.0 A	0.1 E			36/
★2N2153	G	P		2N2152	AP	170	C	60	S	30	50	5.0 A	0.1 E			36/5
2N2153A	G	P			AP	170	C	45	0	30	50	5.0 A	0.1 E			36/
★2N2154	G	P		2N2152	AP	170	C	75	S	30	50	5.0 A	0.1 E			36/5
2N2154A	G	P			AP	170	C	60	0	30	50	5.0 A	0.1 E			36/
2N2155	G	P			AP	170	C	90	S	30	50	5.0 A	0.1 E			36/
2N2155A	G	P			AP	170	C	65	0	30	50	5.0 A	0.1 E			36/
★2N2156	G	P		2N2154	AP	170	C	45	S	30	80	5.0 A	0.16 E			36/5
2N2156A	G	P			AP	170	C	30	0	30	80	5.0 A	0.16 E			36/
★2N2157	G	P		2N2154	AP	170	C	60	S	30	80	5.0 A	0.16 E			36/5
2N2157A	G	P			AP	170	C	45	0	30	80	5.0 A	0.16 E			36/
★2N2158	G	P		2N2154	AP	170	C	75	S	30	80	5.0 A	0.16 E			36/5
2N2158A	G	P			AP	170	C	60	0	30	80	5.0 A	0.16 E			36/
2N2159	G	P			AP	170	C	90	S	30	80	5.0 A	0.16 E			36/
2N2159A	G	P			AP	170	C	65	0	30	80	5.0 A	0.16 E			36/
2N2160				TABLE10	UJT											
2N2161	S	N	2N2222	2N2218	SH	0.2	A	35	0	0.05	60	10 m	25 T	3.0	350/700	5/31
2N2162	S	P	2N2946	2N2944	SC	0.15	A	30	0	0.05			14 T	10		5/31
2N2163	S	P	2N2945	2N2944	SC	0.15	A	15	0	0.05			14 T	10		5/31
2N2164	S	P	2N2944	2N2944	SC	0.15	A	8	0	0.05			24 T	10		5/31
2N2165	S	P	2N2946	2N2944	SC	0.15	A	30	0	0.05			10 T	10		5/31
2N2166	S	P	2N2945	2N2944	SC	0.15	A	15	0	0.05			10 T	10		5/31
2N2167	S	P	2N2944	2N2944	SC	0.15	A	8	0	0.05			16 T	10		5/31
2N2168	G	P			SH	0.06	A	15	0	0.1	50	10 m		2.5	18/18	9/
2N2169	G	P			SH	0.06	A	15	0	0.1	40	10 m		2.5	18/18	9/
2N2170	G	P			SH	0.06	A	10	0	0.1	40	10 m		3.0	20/20	9/
★2N2171	G	P		2N381	A	0.2	A	25	R	0.4	110	20 m				5/31
2N2172	G	P			S	0.2	A	15	0	0.4	30	10 m	4.0 B			5/
2N2173	G	P			SH	0.24	A	15	0	0.75	30	200 m		6.0	60/180	39/
2N2175	S	P			A	0.1	A	6	0	0.05	30	20 *	10 T			5/
2N2176	S	P			A	0.1	A	6	0	0.05	30	20 *	10 T			18/
2N2177	S	P			A	0.1	A	6	0	0.05	15	5.0 *	6.4 B	14		5/
2N2178	S	P			A	0.1	A	6	0	0.05	15	5.0 *	6.4 B	14		18/
2N2180	G	P			SH	0.05	A	6	0	0.05	100	10 m	60 T	12		24/
2N2181	S	P	2N2945	2N2944	SC	0.15	A	25	0	0.05	10	5.0 m	6.0 T	12		1/
2N2182	S	P	2N2945	2N2944	SC	0.15	A	25	0	0.05	10	5.0 m	6.0 T	12		1/
2N2183	S	P	2N2944	2N2944	SC	0.15	A	10	0	0.05	10	5.0 m	6.0 T	12		1/
2N2184	S	P	2N2944	2N2944	SC	0.15	A	10	0	0.05	10	5.0 m	6.0 T	12		1/
2N2185	S	P	2N2946	2N2944	SC	0.15	A	30	0	0.05			6.5 T	9.0		18/
2N2186	S	P	2N2946	2N2944	SC	0.15	A	30	0	0.05			6.5 T	9.0		18/
2N2187	S	P	2N2946	2N2944	SC	0.15	A	30	0	0.05			6.5 T	9.0		18/
2N2188	G	P	2N3323	2N3323	AH	0.125	A	25	0	0.03	40	1.5 m	60 T	2.5		58/
2N2189	G	P	2N3323	2N3323	AH	0.125	A	25	0	0.03	60	1.5 m	102 T	2.5		58/
2N2190	G	P	2N3323	2N3323	AH	0.125	A	25	0	0.03	40	1.5 m	60 T	2.5		58/
2N2191	G	P	2N3323	2N3323	AH	0.125	A	25	0	0.03	60	1.5 m	102 T	2.5		58/
★2N2192	S	N		2N2192	SH	0.8	A	40	0	1.0	100	150 m		20	70/200	5/31

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
★2N2192A	S	N		2N2192	SH	0.8	A	40	0	1.0	100	150 m		20	70/200	5/31
★2N2192B	S	N		2N2192	SH	0.8	A	40	0	1.0	100	150 m		20	70/200	5/31
★2N2193	S	N		2N2192	SH	0.8	A	50	0	1.0	40	150 m		20	70/200	5/31
★2N2193A	S	N		2N2192	SH	0.8	A	50	0	1.0	40	150 m		20	70/200	5/31
★2N2193B	S	N		2N2192	SH	0.8	A	50	0	1.0	40	150 m		20	70/200	5/31
★2N2194	S	N		2N2192	SH	0.8	A	40	0	1.0	40	150 m		20	70/200	5/31
★2N2194A	S	N		2N2192	SH	0.8	A	40	0	1.0	20	150 m		20	70/200	5/31
★2N2194B	S	N		2N2192	SH	0.8	A	40	0	1.0	20	150 m		20	70/200	5/31
★2N2195	S	N		2N2192	SH	0.8	A	25	0	1.0	20	150 m		20	70/200	5/31
★2N2195A	S	N		2N2192	SH	0.8	A	25	0	1.0	20	150 m		20		5/31
★2N2195B	S	N		2N2192	SH	0.8	A	25	0	1.0	20	150 m		20		5/
2N2196	S	N	2N3766	2N3766	AP	2.0	A	60	R	1.0	30	0.2 A				
2N2197	S	N	2N3766	2N3766	AP	2.0	A	60	R	1.0	75	0.2 A				
2N2198	S	N			AH	0.6	A	80	0	0.2	35	0.1 A	4.0 T	120		5/
2N2199	G	P			AH	0.075	A	10	0	0.1	9.0	3.0 m	120 T	2.8		9/
2N2200	G	P			AH	0.075	A	10	0		9.0	3.0 m	120 T			
2N2201	S	N	2N5681	2N5681	A	1.0	C	100	0	1.0	25	200 m	10 T	75		
2N2202	S	N	2N5681	2N5681	A	1.0	C	100	0	1.0	25	200 m	10 T	75		
2N2203	S	N	2N5681	2N5681	A	1.0	C	100	0	1.0	25	200 m	10 T	75		
2N2204	S	N	2N5681	2N5681	A	1.0	C	100	0	1.0	25	200 m	10 T	75		
2N2205	S	N	2N835	2N834	SH	1.0	C	12	0	0.2	20	10 m		6.0	40/75	18/
2N2206	S	N	2N835	2N834	SH	1.0	C	12	0	0.2	40	10 m		6.0	40/75	46/
2N2207	G	P			AH	0.26	A	50	R	0.05	36	10 m	112 B			7/
2N2208	G	P			AH	0.12	A	10	0	0.01	15	1.5 m		3.0		44/
2N2209	G	P			S	0.15	A	12	0	0.1	50	24 m	4.8 B	20		5/
2N2210	G	P	2N2075	2N2075	AP	75	C	65	0	15	25	5.0 A	0.125 E			36/
2N2211	G	P			AP	90	C	60	S	5.0	60	1.0 A	0.3 E			3/
★2N2212	G	P		2N2212	AHP	60	C	60	0	10	50	5.0 A	0.45 T			41/4
2N2213				TABLE10	UJT											
2N2214	S	N	2N835	2N834	SH	0.25	C	15	0	0.2	25	10 m	200 T	7.0		
2N2216	S	P	2N3498	2N3498	SH	3.0	C	100	0	0.25	25	50 m	50 T	15		5/
2N2217	S	N	2N2218	2N2218	SH	0.8	A	30	0	0.8	20	150 m	250 T	8.0		5/
★2N2218	S	N		2N2218	SH	0.8	A	30	0	0.8	40	150 m	250 T	8.0		5/31
★2N2218A	S	N		2N2218	SH	0.8	A	40	0	0.8	40	.15 A	250 T	8.0		5/31
★2N2219	S	N		2N2218	SH	0.8	A	30	0	0.8	100	150 m	250 T	8.0		5/31
★2N2219A	S	N		2N2218	SH	0.8	A	40	0	0.8	100	.15 A	300 T	8.0		5/31
2N2220	S	N	2N2222	2N2218	SH	0.5	A	30	0	0.8	20	150 m	250 T	8.0		18/
★2N2221	S	N		2N2218	SH	0.5	A	30	0	0.8	40	150 m	250 T	8.0		18/22
★2N2221A	S	N		2N2218	SH	0.5	A	40	0	0.8	40	.15 A	250 T	8.0		18/22
★2N2222	S	N		2N2218	SH	0.5	A	30	0	0.8	100	150 m	250 T	8.0		18/22
★2N2222A	S	N		2N2218	SH	0.5	A	40	0	0.8	100	.15 A	300 T	8.0		18/22
2N2222B	S	N	2N2222A	2N2218	SH	1.8	C	40	0	1.0	100	150 m	300 T	8.0		18/
★2N2223	S	N		2N2060	AM	0.5	A	80	R	0.5	50	10 m	50 T	15		78/654
★2N2223A	S	N		2N2060	AM	0.5	A	80	R	0.5	50	10 m	50 T	15		78/654
★2N2224	S	N		2N2224	SH	0.8	A	40	0	0.5	35	10 m	250 T			78/654
2N2225	G	P			S	0.2	A	4	0	0.4	100	100 m	20 B	20		5/
2N2226	S	N	2N6057	2N6057	AP	150	C	50	V	10	100	9.0 A	0.7 E			
2N2227	S	N	2N6057	2N6057	AP	150	C	100	V	10	100	9.0 A	0.7 E			
2N2228	S	N			AP	150	C	150	V	10	100	9.0 A	0.7 E			
2N2229	S	N			AP	150	C	200	V	10	100	9.0 A	0.7 E			
2N2230	S	N		MJ4033	AP	150	C	50	V	10	350	9.0 A	1.4 E			
2N2231	S	N		MJ4035	AP	150	C	100	V	10	350	9.0 A	1.4 E			
2N2232	S	N			AP	150	C	150	V	10	350	9.0 A	1.4 E			
2N2233	S	N			AP	150	C	200	V	10	350	9.0 A	1.4 E			
2N2234	S	N			SHP	12.5	C	20	0	0.5	15	100 m	50 T		30/600	3/
2N2235	S	N			SHP	12.5	C	20	0	0.5	40	100 m	100 T		25/600	3/
2N2236	S	N	2N2218	2N2218	SH	0.575	A	20	0	0.5	15	100 m	50 T	35	30/600	5/
2N2237	S	N	2N2218	2N2218	SH	0.575	A	20	0	0.5	40	100 m	100 T	35	25/600	5/
2N2238	G	P			AH	0.3	A	30	S	0.05	10	10 m	400 T	3.0		5/
2N2239	S	N	2N4232	2N4231	A	1.0	A	50	R	0.5	30	200 m	T			
2N2240	S	N	2N2218	2N2218	SH	0.6	A	20	0	0.5	40	1.0 m	50 T	35		5/
★2N2241	S	N	2N2219A	2N2218	SH	0.6	A	20	0		100	1.0 m	50 T			
★2N2242	S	N		2N2242	SH	0.36	A	15	0	0.225	40	10 m	250 T	6.0	30/50	18/22
2N2243	S	N	2N3019	2N3019	SH	.8	A	80	0	1.0	40	.15 A	50 T	15	120/600	5/
2N2243A	S	N	2N3019	2N3019	SH	.8	A	80	0	1.0	40	.15 A	50 T	15		5/
2N2244	S	N			A	.5	A	20	0	.05	5.0	2.0 *	60 T	8.0		18/
2N2245	S	N			A	.5	A	20	0	.05	10	2.0 *	60 T	8.0		18/
2N2246	S	N			A	.5	A	20	0	.05	5.0	2.0 *	60 T	8.0		18/
2N2247	S	N			A	.5	A	45	0	.05	5.0	2.0 *	60 T	8.0		18/
2N2248	S	N			A	.5	A	45	0	.05	10	2.0 *	60 T	8.0		18/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N2249	S	N			A	.5	A	45	0	.05	20	2.0 *	60 T	8.0		18/
2N2250	S	N			A	.5	A	20	0	.5	5.0	2.0 *	60 T	8.0		18/
2N2251	S	N			A	.5	A	20	0	.5	10	2.0 *	60 T	8.0		18/
2N2252	S	N			A	.5	A	20	0	.5	20	2.0 *	60 T	8.0		18/
2N2253	S	N			A	.5	A	50	0	.5	5.0	2.0 *	60 T	8.0		18/
2N2254	S	N			A	.5	A	50	0	.5	10	2.0 *	60 T	8.0		18/
2N2255	S	N			A	.5	A	50	0	.5	20	2.0 *	60 T	8.0		18/
★2N2256	S	N		2N2256	SH	.3	A	7	S	.1	17	10 m		5.0	7.0/7.0	18/22
★2N2257	S	N		2N2256	SH	.3	A	7	S	.1	40	10 m		5.0	8.0/7.0	18/22
★2N2258	G	P		2N2256	SH	.15	A	7	S	.1	17	10 m		8.0	8.0/7.0	18/22
★2N2259	G	P		2N2256	SH	.15	A	7	S	.1	40	10 m		8.0	8.0/7.0	
2N2260				TABLE7	THY											
THRU																
2N2262				TABLE7	THY											
2N2266	G	P	2N2145	2N2137	SP	50	C	550		5.0	40	500 m	.2 T		15k/22k	
2N2267	G	P	2N2145	2N2137	SP	50	C	550		5.0	40	500 m	.2 T		15k/22k	
2N2268	G	P	2N2145	2N2137	SP	50	C	550		5.0	40	500 m	.2 T		15k/22k	
2N2269	G	P	2N2145	2N2137	SP	50	C	550		5.0	40	500 m	.2 T		15k/22k	
2N2270	S	N			A	5.0	C	45	0	1.0	30	1.0 m		15		15/
2N2271	G	P			A	.25	A	15	R	.5	50	35 m	5.0 E			5/
2N2272	S	N	2N929	2N929	SH	.36	A	20	R		80	10 m				
★2N2273	G	P		2N2273	AH	.1	A	15	0	.1	20	1.0 m	200 T	3.5		18/22
2N2274	S	P	2N2946	2N2944	SC	.15	A	25	0	.05	10	5.0 m	6.0 T	9.0		18/
2N2275	S	P	2N2946	2N2944	SC	.15	A	25	0	.05	10	5.0 m	6.0 T	9.0		18/
2N2276	S	P	2N2944	2N2944	SC	.15	A	10	0	.05	10	5.0 m	6.0 T	9.0		18/
2N2277	S	P	2N2944	2N2944	SC	.15	A	10	0	.05	10	5.0 m	6.0 T	9.0		18/
2N2278	S	P	2N2945	2N2944	SC	.15	A	15	0	.05			7.6 T	9.0		18/
2N2279	S	P	2N2945	2N2944	SC	.15	A	15	0	.05			7.6 T	9.0		18/
2N2280	S	P	2N2944	2N2944	SC	.15	A	6	0	.05			16 T	10		18/
2N2281	S	P	2N2944	2N2944	SC	.15	A	6	0	.05			16 T	10		18/
2N2282	G	P			AHP	5.0	C	30	0	3.0	15	3.0 A	20 T			37/
2N2283	G	P			AHP	5.0	C	60	0	3.0	15	3.0 A	20 T			37/
2N2284	G	P			AHP	5.0	C	100	0	3.0	15	3.0 A	20 T			37/
★2N2285	G	P		2N1651	AP	100	C	30	0	25	35	10 A	.6 T			3/
★2N2286	G	P		2N1651	AP	100	C	60	0	25	35	10 A	.6 T			3/
★2N2287	G	P		2N1651	AP	100	C	80	0	25	35	10 A	.6 T			3/
★2N2288	G	P		2N2288	AP	60	C	40	R	10	20	5.0 A	.45 T			3/
★2N2289	G	P		2N2288	AP	60	C	80	R	10	20	5.0 A	.45 T			3/
★2N2290	G	P		2N2288	AP	60	C	120	R	10	20	5.0 A	.45 T			3/
★2N2291	G	P		2N2291	AP	60	C	30	0	10	50	5.0 A	.45 T			3/
★2N2292	G	P		2N2291	AP	60	C	70	0	10	50	5.0 A	.45 T			3/
★2N2293	G	P		2N2291	AP	60	C	70	0	10	50	5.0 A	.45 T			3/
2N2294	G	P			SP	70	C	30	0	10	50	5.0 A	.45 T		10k/10k	41/
2N2295	G	P			SP	70	C	50	0	10	50	5.0 A	.45 T		10k/10k	41/
2N2296	G	P			SP	70	C	70	0	10	50	5.0 A	.45 T		10k/10k	41/
2N2297	S	N			AH	.8	A	35	0	1.0	40	150 m	60 T	12		5/
2N2303	S	P			AH	.6	A	50	R	.5	75	150 m	60 T	45		18/
2N2304	S	N	2N4910	2N4910	AP	25	C	60	V	3.0	20	300 m				3/
2N2305	S	N	2N5068	2N5067	AP	.3	C	60	V	6.0	15	800 m				3/
2N2306	S	N			SHP	13	C	50	0	2.0	12	.35 A	175 T	40		8/
2N2307				TABLE10	UJT											
2N2308	S	N	2N4912	2N4910	AP	25	C	80	0	3.0	20	1.0 A	.6 E			8/
2N2309	S	N	2N2218	2N2218	A	.6	A	30	0	.5	25	.2 m		25		5/
2N2310	S	N	2N3020	2N3019	A	.5	A	60	0		12	200 m				46/
2N2311	S	N			A	.5	A	100	0		12	200 m				46/
2N2312	S	N	2N3020	2N3019	A	.5	A	60	0		30	200 m				46/
2N2313	S	N			A	.5	A	100	0		30	200 m				46/
2N2314	S	N	2N2221A	2N2218	A	.5	A	40	R		20	150 m	40 T	35		46/
2N2315	S	N	2N2221A	2N2218	A	.5	A	40	R		40	150 m	50 T	35		46/
2N2316	S	N	2N3020	2N3019	A	.5	A	80	R		40	150 m	50 T	20		46/
2N2317	S	N	2N2193	2N2192	A	.5	A	50	R		40	150 m	60 T	25		46/
2N2318	S	N	2N929	2N929	SH	.36	A	25	S		15	.1 m	300 T	5.0	60/50	18/
2N2319	S	N	2N929	2N929	SH	.3	A	25	S		15	.1 m	300 T	5.0	60/50	46/
2N2320	S	N	2N929	2N929	SH	.6	A	25	S		15	.1 m	300 T	5.0	60/50	5/
2N2322				TABLE7	THY											
THRU																
2N2329				TABLE7	THY											
2N2330	S	N	2N4124	2N4123	SC	.8	A	20	0	.5	50	10 m	100 T	10		5/31
★2N2331	S	N		2N2330	SC	0.5	A	20	0	0.5	50	10 m	100 T	10		18/22
2N2332	S	P	2N5230	2N5229	SC	0.15	A	15	0	0.1				20		18/22

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N2333	S	P	2N5229	2N5229	SC	0.15	A	5	0	0.1				20		18/22
2N2334	S	P	2N5230	2N5229	SC	0.15	A	15	0	0.1				20		18/22
2N2335	S	P	2N5230	2N5229	SC	0.15	A	15	0	0.1				20		18/22
2N2336	S	P	2N5231	2N5229	SC	0.15	A	35	0	0.1				20		18/22
2N2337	S	P	2N5231	2N5229	SC	0.15	A	35	0	0.1				20		18/22
2N2338	S	N	2N5877	2N5875	AP	150	C	40	0	7.5	7.0	6.0 A	0.105 E	600		36/
2N2339	S	N	2N4910	2N4910	AP	40	C	40	0	2.5	6.0	1.5 A	0.7 T	300		
2N2340	S	N	2N4237		AHP	15	C	40	0	1.0	10	750 m	5.5 E		400/1800	37/
2N2341	S	N	2N5334		AHP	15	C	40	0	1.0	40	750 m	14 E		400/1800	37/
2N2342	S	N	2N4337		AHP	15	C	40	0	1.0	10	750 m	5.5 E		400/1800	37/
2N2343	S	N	2N5334		AHP	15	C	40	0	1.0	40	750 m	14 E		400/1800	37/
2N2344				TABLE7	THY											
THRU																
2N2348				TABLE7	THY											
2N2349	S	N	2N929	2N929	A	0.15	A	24	0	0.25	120	10 m		4.0		5/
2N2350	S	N	2N2222A	2N2218	SH	0.4	A	40	0	1.0	100	150 m	50 T	20		46/
2N2350A	S	N	2N2222A	2N2218	SH	0.4	A	40	0	1.0	100	150 m	50 T	20		46/
2N2351	S	N	2N2193	2N2192	SH	0.4	A	50	0	1.0	40	150 m	50 T	20		46/
2N2351A	S	N	2N2193	2N2192	SH	0.4	A	50	0	1.0	40	150 m	50 T	20		46/
2N2352	S	N	2N2194	2N2192	SH	0.4	A	40	0	1.0	20	150 m	50 T	20		46/
2N2352A	S	N	2N2194	2N2192	SH	0.4	A	40	0	1.0	20	150 m	50 T	20		46/
2N2353	S	N	2N2221	2N2218	SH	0.4	A	25	0	1.0	20	150 m	50 T	20		46/
2N2353A	S	N	2N2221	2N2218	SH	0.35	A	25	0	1.0	20	150 m	50 T	20		46/
2N2354	G	N			A	0.18	A	15	R	0.15	50	35 m				22/
2N2356	S	N			SC	0.6	A	7	0	0.5			50 T	20		
2N2356A	S	N			SC	0.6	A	7	0	0.5			50 T	20		
★2N2357	G	P		2N2357	SP	170	C	30	0	50	30	20 A	0.6 T		15k/10k	41/161
★2N2358	G	P		2N2357	SP	170	C	60	0	50	30	20 A	0.6 T		15k/10k	41/161
★2N2359	G	P		2N2357	SP	170	C	80	0	50	30	20 A	0.6 T		15k/10k	41/161
2N2360	G	P	2N3283	2N3283	AH	0.06	A	20	0	0.05	10	2.0 m		1.3		12/
2N2361	G	P	2N3284	2N3283	AH	0.06	A	20	0	0.05	10	2.0 m		1.3		12/
2N2362	G	P	2N3284	2N3283	AH	0.06	A	20	S	0.05	10	2.0 m		1.3		12/
2N2363	G	P			AH	0.075	A	20	0	0.05	10	2.0 m	800 T	3.0		
2N2364	S	N	2N3020	2N3019	SH	0.4	A	80	0	1.0	40	150 m	50 T	15	570/150	46/
2N2364A	S	N			SH	0.4	A	80	0	1.0	40	150 m	50 T	15	570/150	46/
★2N2368	S	N		2N2368	SH	0.36	A	40	S	0.5	20	10 m	400 T	4.0	12/15	18/22
★2N2369	S	N		2N2369	SH	0.36	A	40	S	0.2	40	10 m	500 T	4.0	12/18	18/22
★2N2369A	S	N		2N2369	SH	0.36	A	40	S			10 m	500 T	0.2	12/18	18/22
2N2370	S	P			L	0.2	A	15	0	0.1	15	25 *		15		5/31
2N2371	S	P			L	0.2	A	15	0	0.1	20	25 *		15		5/31
2N2372	S	P			L	0.15	A	15	0	0.1	15	25 *		15		18/22
2N2373	S	P			L	0.15	A	15	0	0.1	20	25 *		15		18/22
2N2374	G	P			A	0.25	A	35	S		100	100 m				
2N2375	G	P			A	0.25	A	35	S		35	100 m				
2N2376	G	P	2N1193	2N1191	A	0.25	A	35	S		35	100 m				
2N2377	S	P	2N3250	2N3250	AH	0.15	A	25	0	0.05	10	5.0 m	32 T	12		18/22
2N2378	S	P			AH	0.15	A	10	0	0.05	15	15 m	6.0 T	12		18/22
2N2379	G	P			SP	150	C	80	S	15	25	5.0 A	0.1 E		30k/60k	
2N2380	S	N	2N2193	2N2192	SH	0.6	A	40	0	0.5	20	150 m	100 T	14	125/195	5/
2N2380A	S	N	2N2193	2N2192	SH	0.6	A	40	0	0.5	20	150 m	100 T	14	125/195	5/
★2N2381	G	P		2N2381	SH	0.3	A	15	0	0.5	40	200 m	300 T	6.0	22/45	5/31
★2N2382	G	P		2N2381	SH	0.3	A	20	0	0.5	40	200 m	300 T	6.0	22/45	5/31
2N2383	S	N	2N4914	2N4913	AP	85	C	60	0	5.0	20	1.5 A	0.6 E			53/
2N2384	S	N	2N4914	2N4913	AP	85	C	60	0	5.0	20	1.5 A	0.6 E			
2N2386,A				TABLE8	FET											
2N2387	S	N			A	0.3	A	45	0	0.03	40	10 *	30 T	8.0		
2N2388	S	N			A	0.3	A	45	0	0.03	100	10 *	30 T	8.0		
2N2389	S	N	2N2193	2N2192	A	0.45	A	50	R	0.5	40	150 m	60 T	25		
2N2390	S	N	2N3019	2N3019	A	0.45	A	50	R	0.5	100	150 m	70 T	25		
2N2391	S	P	2N3250	2N3250	A	0.3	A	20	0	0.05	15	10 m	140 T	5.0		
2N2392	S	P	2N3250	2N3250	A	0.3	A	20	0	0.05	30	10 m	140 T	5.0		
2N2393	S	P	2N2905	2N2904	A	0.45	A	35	0	0.3	20	150 m	50 T	45		
2N2394	S	P	2N2905	2N2904	A	0.45	A	35	0	0.3	30	150 m	60 T	45		
2N2395	S	N	2N2219	2N2218	A	0.45	A	40	0		20	150 m	40 T			
2N2396	S	N	2N2219	2N2218	A	0.45	A	40	0		40	150 m	50 T			
2N2397	S	N	2N2369A	2N2369A	SH	0.3	A	15	0	0.2	25	10 m	200 T	2.5	25/45	51/
2N2398	G	P	2N3284	2N3283	AH	0.06	A	20	S	0.05	10	2.0 m		1.3		12/
2N2399	G	P	2N3284	2N3283	AH	0.06	A	20	S	0.05	10	2.0 m		1.3		12/
2N2400	G	P	2N964	2N960	SH	0.15	A	7	0	0.1	30	10 m	150 T	4.0	75/270	18/
2N2401	G	P	2N964	2N960	SH	0.15	A	10	0	0.1	50	10 m	200 T	4.0	75/230	18/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No. Case No.
2N2402	G	P	2N2956	2N2955	SH	0.15	A	12	0	0.1	60	10 m	250 T	4.0	75/200	18/
2N2403	S	N			S	1.0	A	60	0	1.0	20	0.6 A	147 T	25	25/25	5/
2N2404	S	N			S	1.0	A	60	0	1.0	40	0.6 A	147 T	25	25/25	5/
★2N2405	S	N		2N1893	A	5.0	C	90	0	1.0	60	150 m		15		5/31
★2N2410	S	N		2N2410	SH	0.8	A	30	0	0.8	30	10 m	200 T	11	65/65	5/31
2N2411	S	P			SH	0.3	A	20	0	0.1	20	10 m	140 T	5.0	25/100	18/
2N2412	S	P			SH	0.3	A	20	0	0.1	40	10 m	140 T	5.0	25/100	18/
2N2413	S	N	2N2221	2N2218	AH	0.3	A	18	0	0.2	30	10 m	300 T	5.0		18/
2N2414	S	N			AL	0.5	A	40	R	0.5	50	10 m	50 T	25		
★2N2415	G	P		2N2415	AH	0.075	A	10	0	0.02	10	2.0 m	500 T	2.0		72/20
★2N2416	G	P		2N2415	AH	0.075	A	10	0	0.02	8.0	2.0 m	400 T	2.0		72/20
2N2417,A				TABLE10	UJT											
THRU																
2N2422,A				TABLE10	UJT											
2N2423	G	P		2N2423	SP	90	C	80	V	5.0	20	2.0 A	0.6 E		45k/35k	3/
2N2424	S	P	2N3250	2N3250	S	0.375	A	5	0	0.05	30	5.0 m	12 B	14	300/500	5/
2N2425	S	P	2N3250A	2N3250	A	0.375	A	10	0	0.05	25	5.0 m	8.0 B	14		5/31
2N2426	G	N			A	0.15	A	25	R	2.0				40		5/
2N2427	S	N			AH	0.5	A	40	0	0.05	20	10 *	50 T			18/22
2N2428	G	P	2N652	2N650	A	0.5	A	32	S	0.1	50	2.0 m	0.5 E			1/
2N2429	G	P	2N652	2N650	A	0.5	A	32	S	0.1	65	2.0 m	0.65 E			1/
2N2430	G	N			A	0.28	A	32	R	0.3	60	0.1 A	0.6 E			1/
2N2431	G	P			A	0.55	A	32	R	1.0	60	0.3 A	0.6 E	80		1/
2N2432	S	N			SC	0.3	A	30	0	0.1	50	1.0 m	20 T	12		18/22
2N2432A	S	N			SC	0.3	A	45	0	0.1	50	1.0 m	20 T	12		18/
2N2433	S	N	2N2193	2N2192	SH	0.5	A	45	0	1.0	40	150 m	80 T	20		46/
2N2434	S	N			SH	0.5	A	45	0	1.0	100	150 m	90 T	20		46/
2N2435	S	N	2N3020	2N3019	SH	0.5	A	80	0	0.5	40	150 m	80 T	15		46/
2N2436	S	N	2N3019	2N3019	SH	0.5	A	80	0	0.5	100	150 m	90 T	15		46/
2N2437	S	N	2N3020	2N3019	AH	0.5	A	75	0	0.5	15	10 m	70 T	15	/6.0	46/
2N2438	S	N	2N3019	2N3019	AH	0.5	A	75	0	0.5	35	10 m	80 T	15		46/
2N2439	S	N	2N3019	2N3019	AH	0.5	A	75	0	0.5	75	10 m	90 T	15		46/
2N2440	S	N	2N3019	2N3019	SH	0.3	A	80	0	0.5	100	150 m	90 T	15		5/
2N2443	S	N	2N3500	2N3498	AH	0.8	A	100	0		50	50 m	50 T	15		5/31
2N2444	G	P			AP	85	C	80	0	10	90	3.0 A	4.5 T			3/
2N2445	G	P			AP	90	C	50	0	15	30	10 A	0.1 T			4/
2N2446	G	P			SP	90	C	50	S	7.0	15	5.0 A	0.045 E		30k/35k	3/
2N2447	G	P	2N1187	2N1175	A	0.075	A	24	0	0.1						
2N2448	G	P	2N1187	2N1175	A	0.075	A	24	0	0.1						
2N2449	G	P	2N652	2N650	A	0.075	A	20	0	0.1						
2N2450	G	P	2N652	2N650	A	0.075	A	20	0	0.1						
2N2451	G	P			SH	0.025	A	5.0	0	0.05	25	10 m	80 T	6.0		24/
2N2452	S	N			AL	0.5	A	80	R							
★2N2453	S	N		2N2453	AM	0.5	A	30	0	0.05	150	1.0 m	60 T	8.0		78/654
★2N2453A	S	N		2N2453	AM	0.5	A	50	0	0.05	150	1.0 m	60 T			78/654
2N2454				TABLE7	THY	0.15	A	15	S	0.2	20	2.0 m	600 T	3.5	30/65	18/22
2N2456	G	P			SH	0.15	A	15	S	0.2	20	2.0 m	1000 T	3.0	15/65	18/22
2N2459	S	N			A	0.4	A	60	0	0.05	10	0.1 m	100 T	5.0		46/
2N2460	S	N			A	0.4	A	60	0	0.05	20	0.1 m	120 T	5.0		46/
2N2461	S	N			A	0.4	A	60	0	0.05	40	0.1 m	140 T	5.0		46/
2N2462	S	N			A	0.4	A	60	0	0.05	60	0.1 m	160 T	5.0		46/
2N2463	S	N			A	0.5	A	60	0	0.05	10	0.1 m	100 T	5.0		18/22
2N2464	S	N			A	0.5	A	60	0	0.05	20	0.1 m	120 T	5.0		18/22
2N2465	S	N			A	0.5	A	60	0	0.05	40	0.1 m	140 T	5.0		18/22
2N2466	S	N			A	0.5	A	60	0	0.05	60	0.1 m	160 T	5.0		18/22
2N2467	G	P			AP	5.0	C	30	0	3.0	30	0.5 A	20 T			
2N2468	G	P			AP	5.0	C	60	0	3.0	30	0.5 A	20 T			
2N2469	G	P			AP	5.0	C	100	0	3.0	30	0.5 A	20 T			
2N2472	S	N	2N3500	2N3498	AP	1.0	A	100	0	1.0	30	0.2 A	10 T	75		
2N2473	S	N	2N3500	2N3498	AP	1.0	A	100	0	1.0	30	0.2 A	10 T	75		
2N2474	S	P			AP	0.25	A	15	0	0.05	8.0	100 *				5/31
2N2475	S	N	2N835	2N834	SH	0.3	A	6.0	0		20	50 m	600 T	3.0	20/15	5/31
★2N2476	S	N		2N2476	SH	2.0	C	20	0		20	150 m	250 T	10	25/45	5/31
★2N2477	S	N		2N2476	SH	2.0	C	20	0		40	150 m	250 T	10	25/45	5/31
2N2478	S	N	2N2218	2N2218	SH	0.6	A	40	0	0.5	30	150 m	200 T	12	80/185	5/31
2N2479	S	N	2N2218	2N2218	SH	0.6	A	40	0	0.5	30	150 m	150 T	14	100/185	5/31
★2N2480	S	N		2N2060	AM	0.3	A	40	0	0.5	30	1.0 m	50 T	20		78/654
★2N2480A	S	N		2N2060	AM	0.3	A	40	0	0.5	50	1.0 m	50 T	18		78/654
2N2481	S	N		2N2481	SH	1.2	C	15	0	0.5	40	10 m	300 T	5.0	40/55	18/22
2N2482	G	N			AH	0.15	A	15	S	0.1	25	2.0 m	600 T	4.5		18/22

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No.	Case No.
2N2483	S	N	MM2483	MM2483	A	0.36	A	60	0	0.05	40	10 *	12 T	6.0		18	22
2N2484	S	N	MM2484	MM2484	A	0.36	A	60	0	0.05	100	10 *	15 T	6.0		18	22
2N2484A	S	N			A	0.36	A	60	0	0.05	100	10 *	60 T	6.0		18	22
2N2485	S	N			AHP	8.8	C	120	0	1.0	10	0.5 A	100 T	12		5	31
2N2486	S	N			AHP	8.8	C	140	0	1.0	10	0.5 A	100 T	12		5	31
2N2487	G	P			SH	0.06	A	10	0	0.1	20	10 m	360 T	3.0		18	22
2N2488	G	P			SH	0.06	A	10	0	0.1	20	50 m	360 T	3.0		18	22
2N2489	G	P			SH	0.06	A	15	0	0.1	20	10 m	300 T	3.0		18	22
★2N2490	G	P		2N2490	SP	170	C	60	S	15	20	5.0 A	0.1 E		25/15	36	5
★2N2491	G	P		2N2490	SP	170	C	50	S	15	35	5.0 A	0.175 E		25/15	36	5
★2N2492	G	P		2N2490	SP	170	C	70	S	15	25	5.0 A	0.125 E		25/15	36	5
★2N2493	G	P		2N2490	SP	170	C	85	S	15	25	5.0 A	0.125 E		25/15	36	5
2N2494	G	P			AH	0.083	A	20	V	0.01	25	1.0 m		2.0		7	
2N2495	G	P			AH	0.125	A	40	S	0.01	25	1.0 m		200		12	
2N2496	G	P			AH	0.1	A	20	V	0.01	25	1.0 m		2.0			
2N2497				TABLE8	FET												
THRU																	
2N2500				TABLE8	FET												
★2N2501	S	N		2N2501	SH	0.36	A	20	0		50	10 m	350 T	4.0		18	22
2N2502				TABLE7	THY												
THRU																	
2N2508				TABLE7	THY												
2N2509	S	N			AH	1.2	C	80	0	0.2	25	10 *	45 T	6.0		18	22
2N2510	S	N			AH	1.2	C	65	0	0.2	150	10 m	45 T	6.0		18	22
2N2511	S	N			AH	1.2	C	50	0	0.2	240	10 m	45 T	6.0		18	22
2N2512	G	P			AH	0.15	A	70	R	0.03	20	1.0 m	140 T	5.0		33	
2N2514	S	N			A	0.4	A	60	0	0.1	15	5.0 m	30 T	6.0		46	
2N2515	S	N			A	0.4	A	60	0	0.1	30	5.0 m	60 T	6.0		46	
2N2516	S	N			A	0.4	A	60	0	0.1	60	5.0 m	100 T	6.0		46	
2N2517	S	N			A	0.4	A	80	0	0.05	15	5.0 m	30 T	6.0		46	
2N2518	S	N			A	0.4	A	80	0	0.05	30	5.0 m	60 T	6.0		46	
2N2519	S	N			A	0.4	A	80	0	0.05	60	5.0 m	100 T	6.0		46	
2N2520	S	N			A	0.4	A	60	0	0.1	12	1.0 m	40 B	6.0		46	
2N2521	S	N			A	0.4	A	60	0	0.1	25	1.0 m	40 B	6.0		46	
2N2522	S	N			A	0.4	A	60	0	0.1	50	1.0 m	40 B	6.0		46	
2N2523	S	N			A	0.4	A	45	0	0.03	40	10 *	45 T	6.0		46	
2N2524	S	N			A	0.4	A	45	0	0.03	100	10 *	45 T	6.0		46	
2N2525	S	N			AHP	25	C	80	0	1.0	10	.35 A	56 T	25		3	
★2N2526	G	P		2N2526	SHP	85	C	80	0	10	20	3.0 A	0.03 T		11k/9k	3	
★2N2527	G	P		2N2526	SHP	85	C	120	0	10	20	3.0 A	0.03 T		11k/9k	3	
★2N2528	G	P		2N2526	SHP	85	C	160	0	10	20	3.0 A	0.03 T		11k/9k		184
★2N2529	S	N	2N929	2N929	A	0.15	A	40	0	0.025	10	1.0 m	4.8 B	3.0		18	22
2N2530	S	N	2N929	2N929	A	0.15	A	40	0	0.025	12	1.0 m	8.0 B	3.0		18	
2N2531	S	N	2N929	2N929	A	0.15	A	40	0	0.025	20	1.0 m	9.6 B	3.0		18	
2N2532	S	N	2N929	2N929	A	0.15	A	40	0	0.025	45	1.0 m	12.8 B	3.0		18	
2N2533	S	N	2N929	2N929	A	0.15	A	40	0	0.025	20	10 m	8.0 B	3.0		18	
2N2534	S	N	2N929	2N929	A	0.15	A	40	0	0.025	45	10 m	16 B	3.0		18	
2N2535	G	P			A	10	C	30	0		40	0.4 A	0.32 E				
2N2536	G	P			A	10	C	40	0		40	0.4 A	0.32 E				
★2N2537	S	N		2N2537	SH	0.8	A	30	0	0.8	50	150 m	250 T	8.0	40/40	5	31
★2N2538	S	N		2N2537	SH	0.8	A	30	0	0.8	100	150 m	250 T	8.0	40/40	5	31
★2N2539	S	N		2N2537	SH	0.5	A	30	0	0.8	50	150 m	250 T	8.0	40/40	18	22
★2N2540	S	N		2N2537	SH	0.5	A	30	0	0.8	100	150 m	250 T	8.0	40/40	18	22
2N2541	G	P			S	0.215	A	14	0	1.0	60	50 m	8.0 B	20		5	
2N2542				TABLE7	THY												
THRU																	
2N2550				TABLE7	THY												
2N2551	S	P			A	0.4	A	150	0		15	0.1 A				5	
★2N2552	G	P		2N1038	AP	20	C	40	V	3.0	20	1.0 A	0.225 T				
★2N2553	G	P		2N1038	AP	20	C	60	V	3.0	20	1.0 A	0.225 T				
★2N2554	G	P		2N1038	AP	20	C	80	V	3.0	20	1.0 A	0.225 T				
★2N2555	G	P		2N1038	AP	20	C	100	V	3.0	20	1.0 A	0.225 T				
★2N2556	G	P		2N1038	AP	20	C	40	V	3.0	20	1.0 A	0.225 T				
★2N2557	G	P		2N1038	AP	20	C	60	V	3.0	20	1.0 A	0.225 T				
★2N2558	G	P		2N1038	AP	20	C	80	V	3.0	20	1.0 A	0.225 T				
★2N2559	G	P		2N1038	AP	20	C	100	V	3.0	20	1.0 A	0.225 T				
★2N2560	G	P		2N1042	AP	20	C	40	V	3.5	20	3.0 A	0.25 T				183
★2N2561	G	P		2N1042	AP	20	C	60	V	3.5	20	3.0 A	0.25 T				183
★2N2562	G	P		2N1042	AP	20	C	80	V	3.5	20	3.0 A	0.25 T				183
★2N2563	G	P		2N1042	AP	20	C	100	V	3.5	20	3.0 A	0.25 T				183

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	Case No.
★2N2564	G	P		2N1042	AP	20	C	40	V	3.5	20	3.0 A	0.25 T				180
★2N2565	G	P		2N1042	AP	20	C	60	V	3.5	20	3.0 A	0.25 T				180
★2N2566	G	P		2N1042	AP	20	C	80	V	3.5	20	3.0 A	0.25 T				180
★2N2567	G	P		2N1042	AP	20	C	100	V	3.5	20	3.0 A	0.25 T				180
2N2568	G	N			AHP	1.0	C	32	S	0.1	10	40 m	600 T	3.0			
2N2569	S	N			SC	0.3	A	5	0	0.5	50	100 *	100 T	10		18	
2N2570	S	N			SC	0.3	A	5	0	0.5	50	100 *	100 T	10		18	
2N2571	S	N			SC	0.3	A	15	0	0.5	50	100 m	100 T	10		18	
2N2572	S	N			SC	0.3	A	15	0	0.5	50	100 m	100 T	10		18	
2N2573				TABLE7	THY												
THRU																	
2N2579				TABLE7	THY												
2N2580	S	N			SP	150	C	400	0	10	10	5.0 A	2.0 T		2500/3000	36	
2N2581	S	N			SP	150	C	400	0	10	25	5.0 A	2.0 T		2500/3000	36	
2N2582	S	N			SP	150	C	500	0	10	10	5.0 A	2.0 T		2500/3000	36	
2N2583	S	N			SP	150	C	500	0	10	25	5.0 A	2.0 T		2500/3000	36	
2N2584	S	N			SP	150	C	600	0		10	5.0 A	0.3 E				
2N2585	S	N			SP	150	C	600	0		25	5.0 A	0.75 E				
2N2586	S	N			A	0.3	A	45	0		120	10 *					
2N2587	G	P			AH	0.15	A	30	S	0.1	15	8.0 m	1000 T	3.0		18	
2N2588	G	P			AH	0.15	A	20	0	0.03	50	1.5 m	75 T	2.5			
2N2589	S	N			SP	150	C	150	0	7.0	17	7.0 A	0.25 T		1500/5000		
2N2590	S	P			AH	0.4	A	60	0	0.05	10	0.1 m	50 T	5.0		46	
2N2591	S	P			AH	0.4	A	60	0	0.05	20	0.1 m	70 T	5.0		46	
2N2592	S	P			AH	0.4	A	60	0	0.05	40	0.1 m	90 T	5.0		46	
2N2593	S	P			AH	0.4	A	60	0	0.05	60	0.1 m	110 T	5.0		46	
2N2594	S	N	2N5336	2N5336	A	5.0	C	90	R	1.0	50	100 m	40 T	20		5	
2N2595	S	P	2N3496	2N3494	AH	0.4	A	60	0	0.05	15	5.0 m	30 T	6.0		46	
2N2596	S	P	2N3496	2N3494	AH	0.4	A	60	0	0.05	30	5.0 m	40 T	6.0		46	
2N2597	S	P	2N3496	2N3494	AH	0.4	A	60	0	0.05	60	5.0 m	60 T	6.0		46	
2N2598	S	P	2N3497	2N3494	AH	0.4	A	80	0	0.05	15	5.0 m	30 T	6.0		46	
2N2599	S	P	2N3497	2N3494	AH	0.4	A	80	0	0.05	30	5.0 m	40 T	6.0		46	
2N2599A	S	P	2N3497	2N3494	AH	0.4	A	100	0	0.05	30	5.0 m	40 T	6.0		46	
2N2600	S	P	2N3497	2N3494	AH	0.4	A	80	0	0.05	60	5.0 m	60 T	6.0		46	
2N2600A	S	P	2N3497	2N3494	AH	0.4	A	100	0	0.05	60	5.0 m	60 T	6.0		46	
2N2601	S	P	2N3798	2N3798	AH	0.4	A	60	0	0.05	12	1.0 m	20 T	6.0		46	
2N2602	S	P	2N3798	2N3798	AH	0.4	A	60	0	0.05	25	1.0 m	40 T	6.0		46	
2N2603	S	P	2N3799	2N3798	AH	0.4	A	60	0	0.05	50	1.0 m	60 T	6.0		46	
2N2604	S	P			AH	0.4	A	45	0	0.03	40	10 *	30 T	6.0		46	
2N2605	S	P	2N3798	2N2798	AH	0.4	A	45	0	0.03	100	10 *	30 T	6.0		46	
2N2605A	S	P			AH	0.4	A	45	0	0.03	50	1.0 *	45 T	6.0		46	
2N2606				TABLE8	FET												
THRU																	
2N2609				TABLE8	FET												
2N2610	S	N	2N929	2N929	A	0.15	A	40	0								
2N2611	S	N	2N3766	2N3766	AP	2.0	A	100	0	1.0	7.0	0.2 A	4.0 T	75			
2N2612	G	P	2N1559	2N1539	AP	75	C	65	V	15	85	10 A				3	
2N2613	G	P	2N1193	2N1191	A	0.12	A	25	R	0.05			3.2 B			1	
2N2614	G	P	2N1193	2N1191	A	0.12	A	35	R	0.05			3.2 B	12		1	
2N2615	S	N			AL	3.0	A	15	0		20	3.0 m	500 T	2.8			
2N2616	S	N	2N1559	2N1539	AL	3.0	A	15	0	0.05	20	3.0 m	600 T	2.8		18	
2N2617	S	P	2N3250	2N3250	A	0.25	A			0.1	15	20 m				18	
2N2618	S	N	2N2219	2N2218	AH	0.6	A	40	0	0.75	25	10 m	200 T	14		5	
2N2619				TABLE7	THY												
2N2620				TABLE8	FET												
2N2621	G	P			AH	0.15	A	15	S	0.1	15	1.0 m	13 T	3.5		5	
2N2622	G	P			AH	0.15	A	24	S	0.1	15	1.0 m	15 T	3.5		5	
2N2623	G	P			AH	0.15	A	32	S	0.1	20	1.0 m	16 T	3.5		5	
2N2624	G	P			AH	0.15	A	15	S	0.1	20	1.0 m	13 T	3.5		5	
2N2625	G	P			AH	0.15	A	24	S	0.1	15	1.0 m	15 T	3.5		5	
2N2626	G	P			AH	0.15	A	32	S	0.1	20	1.0 m	16 T	3.5		5	
2N2627	G	P			AH	0.15	A	15	S	0.1	15	1.0 m	13 T	3.5		5	
2N2628	G	P			AH	0.15	A	24	S	0.1	15	1.0 m	15 T	3.5		5	
2N2629	G	P			AH	0.15	A	32	S	0.1	10	1.0 m	16 T	3.5		5	
2N2630	G	P			SH	0.3	A	10	0	0.1	25	100 m	300 T	4.0		18	
2N2631	S	N	2N3553	2N3375	A	8.75	C	80	V	1.5	8.0	200 m		20			
2N2632	S	N	2N5477	2N5477	AP	40	C	60	0	5.0	40	1.0 A	20 T	150	80/140		
2N2633	S	N	2N5477	2N5477	AP	40	C	80	0	5.0	40	1.0 A	20 T	150	80/140		
2N2634	S	N	2N5479	2N5477	AP	40	C	100	0	5.0	40	1.0 A	20 T	150	80/140		
★2N2635	G	P		2N2635	SH	0.15	A	12	0	0.1	45	50 m	150 T	5.0	50/250	18	22

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N2636	G	P			SP	100	C	60	0	25	20	25 A	0.6 T		700/7500	41/
2N2637	G	P			SP	100	C	60	0	25	20	25 A	0.6 T		700/7500	41/
2N2638	G	P			SP	100	C	60	0	25	20	25 A	0.6 T		700/7000	41/
★2N2639	S	N		2N2639	AM	0.3	A	45	0	0.03	50	10 *	35 T	8.0		78/654
★2N2640	S	N		2N2639	AM	0.3	A	45	0	0.03	50	10 *	35 T	8.0		78/654
★2N2641	S	N		2N2639	AM	0.3	A	45	0	0.03	50	10 *	35 T	8.0		78/654
★2N2642	S	N		2N2639	AM	0.3	A	45	0	0.03	100	10 *	35 T	8.0		8/654
★2N2643	S	N		2N2639	AM	0.3	A	45	0	0.03	100	10 *	35 T	8.0		78/654
★2N2644	S	N		2N2639	AM	0.3	A	45	0	0.03	100	10 *	35 T	8.0		78/654
2N2645	S	N			AM	0.5	A	50	R		100	150 m	50 T	25		18/
2N2646				TABLE10	UJT											
2N2648	G	P			S	5.0	C	10	0	1.0	80	1.0 A	10 T		300/1400	5/
2N2649	S	N			AHP	8.7	C	65	0	1.0	10	0.5 A	100 T	12		5/
2N2650	S	N			AHP	8.7	C	140	0	1.0	10	0.5 A	100 T	12		5/
2N2651	S	N			SH	0.36	A	20	0	0.5	25	10 m	350 T	4.0	35/75	18/
★2N2652	S	N		2N6252	AM	0.3	A	60	0	0.5	50	1.0 m	60 T	15		78/654
★2N2652A	S	N		2N6252	AM	0.3	A	60	0	0.5	50	1.0 m	60 T	15		78/654
2N2653				TABLE7	THY											
2N2654	G	P			AH	0.1	A			0.01	25	1.0 m		1.7		12/
2N2655	S	N	2N5681	2N5681	AP	15	C	100	0	0.5	30	0.2 A	0.25 T			5/
2N2656	S	N	2N2222	2N2218	AH	0.36	A	15	0	0.2	40	0.1 m	250 T	5.0		18/
2N2657	S	N	2N5336	2N5336	SP	1.25	A	60	0	5.0	40	1.0 A	20 T		100/1500	5/
2N2658	S	N	2N5336	2N5336	SP	1.25	A	80	0	5.0	40	1.0 A	20 T		100/1500	5/
2N2659	G	P			AP	15	C	50	V	3.0	30	500 m	0.28 T			
2N2660	G	P			AP	15	C	70	V	3.0	30	500 m	0.28 T			
2N2661	G	P			AP	15	C	90	V	3.0	30	500 m	0.28 T			
2N2662	G	P			AP	15	C	50	V	3.0	30	500 m	0.28 T			
2N2663	G	P			AP	15	C	70	V	3.0	30	500 m	0.28 T			
2N2664	G	P			AP	15	C	90	V	3.0	30	500 m	0.28 T			
2N2665	G	P			AP	15	C	50	V	3.0	50	500 m	0.3 T			
2N2666	G	P			AP	15	C	70	V	3.0	50	500 m	0.3 T			
2N2667	G	P			AP	15	C	90	V	3.0	50	500 m	0.3 T			
2N2668	G	P			AP	15	C	50	V	3.0	50	500 m	0.3 T			
2N2669	G	P			AP	15	C	70	V	3.0	50	500 m	0.3 T			
2N2670	G	P			AP	15	C	70	V	3.0	50	500 m	0.3 T			
2N2671	G	P			AH	0.1	A	25	B	0.01	40	1.0 m	200 T	2.5		12/
2N2672	G	P			AH	0.1	A	25	B	0.01	40	1.0 m	18 T	2.5		39/
2N2672A	G	P			AH	0.1	A	32	S	0.01	40	1.0 m				39/
2N2673	S	N	2N2222A	2N2218	A	0.25	A	45	0	0.025	8.0	1.0 m	2.0 B	4.0		46/
2N2674	S	N	2N2222A	2N2218	A	0.25	A	45	0	0.025	12	1.0 m	4.0 B	4.0		46/
2N2675	S	N	2N2222A	2N2218	A	0.25	A	45	0	0.025	22	1.0 m	8.0 B	4.0		46/
2N2676	S	N	2N2222A	2N2218	A	0.25	A	45	0	0.025	45	1.0 m	8.0 B	4.0		46/
2N2677	S	N	2N2221A	2N2218	A	0.25	A	35	0	0.025	20	1.0 m	8.0 B	3.0		46/
2N2678	S	N	2N2221A	2N2218	A	0.25	A	35	0	0.025	45	1.0 m	16 B	3.0		46/
2N2679				TABLE7	THY											
THRU																
2N2690				TABLE7	THY											
2N2691	G	P			SP	100	C	80	0	20	30	20 A	6.0 T			41/
2N2691A	G	P			SP	170	C	80	0		50	20 m				
2N2692	S	N	2N929	2N929	SH	0.3	A	30	0	0.05	90	100 *	42 T	5.0		18/
2N2693	S	N	2N929	2N929	SH	0.3	A	30	0	0.03	40	10 *	42 T	5.0	700/1900	18/
2N2694	S	N	2N929	2N929	SH	0.3	A	20	0	0.03	20	10 *	42 T	5.0	1200/3100	18/
2N2695	S	P			S	0.36	A	25	0	0.5	30	50 m	100 T	20	75/170	46/
★2N2696	S	P		2N2696	S	0.36	A	25	0	0.5	30	50 m	100 T	20	75/170	18/22
2N2697	S	N	2N5478	2N5471	SP	18	C	60	0	5.0	40	1.0 A	20 T		100/1500	
2N2698	S	N	2N5478	2N5471	SP	18	C	80	0	5.0	40	1.0 A	20 T		100/1500	
2N2699	G	P	2N964	2N960	SH	0.15	A	8	0	0.1	40	10 m	300 T	3.5	45/80	1/
2N2706	G	P			A	0.5	A	32	S	0.2	65	20 m	1.04 B			
2N2707	G															
2N2708	S	N			AH	0.2	A	20	0	0.05	30	2.0 m	700 T	1.5		20/
2N2709	S	P	2N2800	2N2800	A	0.24	A	35	0	0.5	10	0.2 m	0.16 B	110		5/
★2N2710	S	N		2N2710	SH	0.36	A	20	0	0.5	40	10 m	500 T	4.0	20/35	18/22
2N2711	S	N	MPS2711	MPS2711	A	0.2	A	18	0	0.1	30	2.0 m		4.5		92/
2N2712	S	N	MPS2712	MPS2711	A	0.2	A	18	0	0.1	75	2.0 m		4.5		92/
2N2713	S	N	MPS2713	MPS2713	A	0.2	A	18	0	0.2	30	2.0 m				92/
2N2714	S	N	MPS2714	MPS2713	A	0.2	A	18	0	0.2	75	2.0 m				92/
2N2715	S	N			A	0.2	A	18	0	0.05	30	2.0 m		5.0		92/
2N2716	S	N			A	0.2	A	18	0	0.05	75	2.0 m		5.0		92/
2N2717	G	P			SH	0.1	A	15	0	0.03	50	30 m	300 T	5.0	75/115	18/
2N2718	G	P			SH	0.24	A	12	0	0.4	25	170 m	150 T	10	100/250	5/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
★2N2719	S	N			SH	0.3	A	8	0	0.2	30	60 m	200 T	6.0		18/22
★2N2720	S	N		2N2720	AM	0.3	A	60	0	0.04	30	0.1 m	80 T	6.0		78/654
★2N2721	S	N		2N2720	AM	0.3	A	60	0	0.04	30	0.1 m	80 T	6.0		78/654
★2N2722	S	N		2N2722	AM	0.3	A	45	0	0.04	50	1.0 *	100 T	6.0		78/654
★2N2723	S	N		2N2723	AL	0.5	A	60	0	0.04	2k	10 m	100 T	10		72/20
2N2724	S	N			AL	0.5	A	60	0	0.04	7k	10 m	100 T	10		
★2N2725	S	N		2N2723	AL	0.5	A	45	0	0.03	2k	0.1 m	100 T	10		72/20
2N2726	S	N	2N3440	2N3439	AHP	1.0	A	200	R	0.5	30	0.2 A	15 T			5/
2N2727	S	N			AHP	1.0	A	200	R	0.5	75	0.2 A	15 T			5/
★2N2728	G	P		2N2728	SHP	170	C	5	0	0.05	40	20 A	0.12 E			36/7
2N2729	S	N			AH	0.3	A	15	0	0.05	20	3.0 m	600 T	2.8		46/
2N2730	G	P	MP506	MP500	SP	170	C	60	0	65	30	25 A	0.2 T			36/
2N2731	G	P	MP505	MP500	SP	170	C	45	0	65	30	25 A	0.2 T			36/
2N2732	G	P	MP504	MP500	SP	170	C	30	0	65	30	25 A	0.2 T			36/
2N2733	G	P	MP506	MP500	SP	140	C	60	0	65	30	25 A	0.2 T			36/
2N2734	G	P	MP505	MP500	SP	140	C	45	0	65	30	25 A	0.2 T			36/
2N2735	G	P	MP504	MP500	SP	140	C	30	0	65	30	25 A	0.2 T			36/
2N2736	G	P	MP506	MP500	SP	140	C	60	0	65	30	25 A	0.2 T			36/
2N2737	G	P	MP505	MP500	SP	140	C	45	0	65	30	25 A	0.2 T			36/
2N2738	G	P	MP504	MP500	SP	140	C	30	0	65	30	25 A	0.2 T			36/
2N2739	S	N	2N5885	2N5883	SP	200	C	50	V	20	10	10 A			10k/20k	
2N2740	S	N	2N5629	2N5629	SP	200	C	100	V	20	10	10 A			10k/20k	
2N2741	S	N	2N5631	2N5629	SP	200	C	150	V	20	10	10 A			10k/20k	
2N2742	S	N			SP	200	C	200	V	20	10	10 A			10k/20k	
2N2743	S	N			SP	200	C	250	V	20	10	10 A			10k/20k	
2N2744	S	N			SP	200	C	300	V	20	10	10 A			10k/20k	
2N2745	S	N	2N5885	2N5883	SP	200	C	50	V	20	10	15 A			12k/21k	
2N2746	S	N	2N5886	2N5883	SP	200	C	100	V	20	10	15 A			12k/21k	
2N2747	S	N			SP	200	C	150	V	20	10	15 A			12k/21k	
2N2748	S	N			SP	200	C	200	V	20	10	15 A			12k/21k	
2N2749	S	N			SP	200	C	250	V	20	10	15 A			12k/21k	
2N2750	S	N			SP	200	C	300	V	20	10	15 A			12k/21k	
2N2751	S	N	2N5685	2N5685	SP	200	C	50	V	20	10	20 A			13k/22k	
2N2752	S	N	2N5686	2N5685	SP	200	C	100	V	20	10	20 A			13k/22k	
2N2753	S	N			SP	200	C	150	V	20	10	20 A			13k/22k	
2N2754	S	N			SP	200	C	200	V	20	10	20 A			13k/22k	
2N2755	S	N			SP	200	C	250	V	20	10	20 A			13k/22k	
2N2756	S	N			SP	200	C	300	V	20	10	20 A			13k/22k	
2N2757	S	N			SP	200	C	50	V	30	10	10 A			10k/20k	
2N2758	S	N			SP	200	C	100	V	30	10	10 A			10k/20k	
2N2759	S	N			SP	200	C	150	V	30	10	10 A			10k/20k	
2N2760	S	N			SP	200	C	200	V	30	10	10 A			10k/20k	
2N2761	S	N			SP	200	C	250	V	30	10	10 A			10k/20k	
2N2762	S	N			SP	200	C	300	V	30	10	10 A			10k/20k	
2N2763	S	N			SP	200	C	50	V	30	10	15 A			12k/21k	
2N2764	S	N			SP	200	C	100	V	30	10	15 A			12k/21k	
2N2765	S	N			SP	200	C	150	V	30	10	15 A			12k/21k	
2N2766	S	N			SP	200	C	200	V	30	10	15 A			12k/21k	
2N2767	S	N			SP	200	C	250	V	30	10	15 A			12k/21k	
2N2768	S	N			SP	200	C	300	V	30	10	15 A			12k/21k	
2N2769	S	N			SP	200	C	50	V	30	10	20 A			13k/22k	
2N2770	S	N			SP	200	C	100	V	30	10	20 A			13k/22k	
2N2771	S	N			SP	200	C	150	V	30	10	20 A			13k/22k	
2N2772	S	N			SP	200	C	200	V	30	10	20 A			13k/22k	
2N2773	S	N			SP	200	C	250	V	30	10	20 A			13k/22k	
2N2774	S	N			SP	200	C	300	V	30	10	20 A			13k/22k	
2N2775	S	N			SP	200	C	50	V	30	10	25 A			14k/23k	
2N2776	S	N			SP	200	C	100	V	30	10	25 A			14k/23k	
2N2777	S	N			SP	200	C	150	V	30	10	25 A			14k/23k	
2N2778	S	N			SP	200	C	200	V	30	10	25 A			14k/23k	
2N2779	S	N			SP	200	C	250	V	30	10	25 A			14k/23k	
2N2780	S	N			SP	200	C	300	V	30	10	25 A			14k/23k	
2N2781	S	N			AHP	200	C	30	0	2.0	7.5	.35 A	75 T	40		8/
2N2782	S	N			AHP	200	C	40	0	2.0	7.5	.35 A	75 T	40		8/
2N2783	S	N			AHP	200	C	40	0	2.0	7.5	.35 A	75 T			8/
2N2784	S	N			SH	0.3	A	6	0		20	30 m	1000 T	3.0	9.0/9.0	18/
★2N2785	S	N		2N2785	AL	0.5	A	40	0		2k	0.1 A	10 T	30		72/20
2N2786	G	P			AH	1.5	C	20	0	0.15	33	0.1 A		5.0		39/
2N2786A	G	P			AH	1.5	C	20	0		33	0.1 A				
2N2787	S	N	2N2218	2N2218	SH	0.8	A	35	0	0.8	20	150 m	250 T		50/50	5/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N2788	S	N	2N2218A	2N2218	SH	0.8	A	35	0	0.8	40	150 m	250 T		50/60	5/
2N2789	S	N	2N2219A	2N2218	SH	0.8	A	35	0	0.8	100	150 m	250 T		50/70	5/
2N2790	S	N	2N2218	2N2218	SH	0.5	A	35	0	0.8	20	150 m	250 T		50/50	18/
2N2791	S	N	2N2221A	2N2218	SH	0.5	A	35	0	0.8	40	150 m	250 E		50/60	18/
2N2792	S	N	2N2222A	2N2218	SH	0.5	A	35	0	0.8	100	150 m	250 E		50/70	18/
2N2793	G	P			AHP	170	C	60	0	60	50	15 A	0.1 E			
2N2794				TABLE8	FET											
2N2795	G	P			SH	0.075	A	15	0	0.1	50	50 m	300 T	3.0	24/85	18/
2N2796	G	P			SH	0.075	A	12	0	0.1	30	50 m	300 T	4.0	30/100	18/
2N2797	G	P			SH	0.075	A	20	0	0.1	40	50 m	150 T	3.5	35/145	9/
2N2798	G	P			SH	0.075	A	25	0	0.1	20	50 m	120 T	4.0	45/175	9/
2N2799	G	P			SH	0.075	A	15	0	0.1	20	50 m	120 T	4.0	45/175	9/
★2N2800	S	P		2N2800	SH	0.8	A	35	0	0.8	30	150 m	120 T	25	70/270	5/31
★2N2801	S	P		2N2800	SH	0.8	A	35	0	0.8	75	150 m	120 T	25	70/270	5/31
2N2802	S	P			AM	0.25	A	20	0		20	100 *	60 T			
2N2803	S	P			AM	0.25	A	20	0		20	100 *	60 T			
2N2804	S	P			AP	0.25	A	20	0	0.03	20	100 *	60 T	8.0		
2N2805	S	P			AM	0.25	A	20	0		40	100 *	60 T			
2N2806	S	P			AM	0.25	A	20	0		40	100 *	60 T			
2N2807	S	P			AP	0.25	A	20	0	0.03	40	100 *	60 T	8.0		
2N2808	S	N			AH	0.3	A	10	0	0.025	20	2.0 m	1000 T	0.7		
2N2808A	S	N			AH	0.2	A	10	0	0.025	20	2.0 m	1400 T	0.7		
2N2809	S	N			AH	0.2	A	15	0	0.025	20	2.0 m	600 T	0.7		
2N2809A	S	N			AH	0.2	A	15	0	0.025	20	2.0 m	1000 T	0.7		
2N2810	S	N			AH	0.2	A	10	0	0.025	20	2.0 m	600 T	0 7		
2N2810A	S	N			AH	0.2	A	10	0	0.025	20	2.0 m	1000 T	0.7		
2N2811	S	N	2N5477	2N5477	AP	70	C	60	0	10	20	5.0 A	15 T	350		
2N2812	S	N	2N5478	2N5477	AP	70	C	60	0	10	40	5.0 A	15 T	350		
2N2813	S	N	2N5477	2N5477	AP	70	C	80	0	10	20	5.0 A	15 T	350		
2N2814	S	N	2N5478	2N5477	AP	70	C	80	0	10	40	5.0 A	15 T	350		
2N2815	S	N	MJ7000	MJ7000	SP	200	C	80	0	20	10	10 A	0.6 T		3.5k/12k	
2N2816	S	N	MJ7000	MJ7000	SP	200	C	100	0	20	10	10 A	0.6 T		3.5k/12k	
2N2817	S	N			SP	200	C	150	0	20	10	10 A	0.6 T		3.5k/12k	
2N2818	S	N			SP	200	C	200	0	20	10	10 A	0.6 T		3.5k/12k	
2N2819	S	N	MJ7000	MJ7000	SP	200	C	80	0	25	10	15 A	0.6 T		3.5k/12k	
2N2820	S	N	MJ7000	MJ7000	SP	200	C	100	0	25	10	15 A	0.6 T		3.5k/12k	
2N2821	S	N			SP	200	C	150	0	25	10	15 A	0.6 T		3.5k/12k	
2N2822	S	N			SP	200	C	200	0	25	10	15 A	0.6 T		3.5k/12k	
2N2823	S	N	MJ7000	MJ7000	SP	200	C	80	0	30	10	20 A	0.6 T		3.5k/12k	
2N2824	S	N	MJ7000	MJ7000	SP	200	C	100	0	30	10	20 A	0.6 T		3.5k/12k	
2N2825	S	N			SP	200	C	150	0	30	10	20 A	0.6 T		3.5k/12k	
2N2826	G	P			AP	4.5	C	15	0	1.0	75	100 m				37/
2N2827	G	P			AP	4.5	C	30	0	1.0	75	100 m				37/
2N2828	S	N			SP	40	C	60	0	3.0	20	0.5 A	1.0 T		1500/5000	
2N2829	S	N	2N5477	2N5477	SP	40	C	60	0	3.0	20	1.0 A	1.0 T		1500/5000	
2N2831	S	N	2N2221	2N2218	AH	0.36	A	12	0	0.2	25	10 m	250 T	5.0		18/
★2N2832	G	P		2N2832	SP	85	C	50	0	20	25	10 A	10 T		4000/3100	3/
★2N2833	G	P		2N3832	SP	85	C	75	0	20	25	10 A	10 T		4000/3100	3/
★2N2834	G	P		2N2832	SP	85	C	100	0	20	25	10 A			4000/3100	3/
2N2835	G	P			A	16	C	32	R	1.0	30	1.0 A	0.24 T			
2N2836	G	P	2N3612	2N3611	AP	37.5	C	55	R	3.5	30		0.2 T			3/
★2N2837	S	P		2N2800	SH	0.5	A	35	0	0.8	30	150 m	120 T		60/270	
★2N2838	S	P		2N2800	SH	0.5	A	35	0	0.8	75	150 m	120 T		60/270	
2N2840				TABLE10	UJT											
2N2841				TABLE8	FET											
THRU																
2N2844				TABLE8	FET											
★2N2845	S	N		2N2845	S	0.36	A	30	0		30	150 m	250 T	8.0	40/40	18/22
★2N2846	S	N		2N2845	S	0.8	A	30	0		30	150 m	250 T	8.0	40/40	5/
★2N2847	S	N		2N2845	S	0.36	A	20	0		40	150 m	250 T	8.0	25/40	18/22
★2N2848	S	N		2N2845	S	0.8	A	20	0		40	150 m	250 T	8.0	25/40	5/
2N2849	S	N	2N5337	2N5336	SH	0.85	A	80	0	3.0	100	1.0 A	30 T	125	175/475	
2N2850	S	N	2N5336	2N5336	SH	0.85	A	80	0	3.0	40	1.0 A	30 T	125	175/575	
2N2851	S	N	2N5336	2N5336	SH	0.85	A	80	0	3.0	40	1.0 A	30 T	125	175/575	
2N2852	S	N	2N5335	2N5334	SH	0.85	A	80	0	3.0	20	1.0 A	30 T	125	175/575	
2N2853	S	N	2N5336	2N5336	SH	0.85	A	40	0	3.0	40	1.0 A	30 T	125	175/575	
2N2854	S	N	2N5337	2N5336	SH	0.85	A	40	0	3.0	100	1.0 A	30 T	125	175/475	
2N2855	S	N	2N5336	2N5336	SH	0.85	A	40	0	3.0	40	1.0 A	30 T	125	175/575	
2N2856	S	N	2N5334	2N5334	SH	0.85	A	40	0	3.0	20	1.0 A	30 T	125	175/575	
★2N2857	S	N		2N2857	AH	0.2	A	15	0	0.04	30	3.0 m	1000 T			72/20

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N2858	S	N	2N5335	2N5334	SP	0.6	C	80	0	3.0	20	1.0 A	1.0 T		2000/5000	5/
2N2859	S	N	2N5338	2N5336	SP	0.6	C	100	0	3.0	20	1.0 A	1.0 T		2000/5000	5/
2N2860	G	P			SH	0.15	A	7	0	0.15	40	40 m	250 T	4.0		18/
2N2861	S	P	2N3798	2N3798	A	0.3	A	20	0		30	10 *	60 T			
2N2862	S	P	2N3798	2N3798	A	0.3	A	20	0		12	10 *	45 T			
2N2863	S	N	2N2219	2N2218	AH	0.8	A	25	0	1.0	30	200 m	150 T	13		5/
2N2864	S	N	2N2219	2N2218	AH	0.8	A	25	0	1.0	20	200 m	150 T	13		5/
2N2865	S	N			AH	0.2	A	13	0	0.05	20	4.0 m	600 T	2.5		
2N2866	S	N	2N5477	2N5477	AHP	40	C	80	0	3.0	20	0.5 A	10 T	200		
2N2867	S	N	2N5478	2N5477	AHP	40	C	80	0	3.0	40	0.5 A	10 T	200		
2N2868	S	N	2N3252	2N3252	SH	0.8	A	40	0	1.0	40	.15 A	50 T	20		5/
2N2869	G	P	MP2015		AP	30	C	50	0	10	50	1.0 A	0.2 T			3/
2N2870	G	P	MP2016		AP	30	C	50	0	10	50	1.0 A	0.2 T			3/
2N2871	S	P			SC	0.4	A	60	0		15	1.0 m	0.2 T	70		
2N2872	S	P			SC	0.4	A	110	0		15	1.0 m	0.2 T	70		
2N2873	G	P			AH	0.115	A	35	V	0.01	40	1.0 m	300 T	0.7		
2N2874	S	N			AHP	2.0	A	40	0		7.5	.35 A	140 T			
2N2875	S	P	2N6182	2N6182	AHP	20	C	50	0	2.0	15	1.5 A	25 T	40		8/
2N2876	S	N			AH	17.5	C	60	0	2.5	5.0	2.5 A	150 T	20		
2N2877	S	N	2N5477	2N5477	AHP	53	C	60	0	5.0	20	1.0 A	30 T	150	120/140	111/
2N2878	S	N	2N5478	2N5477	AHP	53	C	60	0	5.0	40	1.0 A	50 T	150	80/140	111/
2N2879	S	N	2N5477	2N5477	AHP	53	C	80	0	5.0	20	1.0 A	30 T	150	120/140	111/
2N2880	S	N	2N5478	2N5477	AHP	53	C	80	0	5.0	40	1.0 A	50 T	150	80/140	111/
2N2881	S	P	2N4235	2N4234	AP	8.5	C	60	0	1.5	20	0.5 A	0.5 E			5/
2N2882	S	P	2N4236	2N4234	AP	8.5	C	100	0	1.5	20	0.5 A	0.5 E			5/
2N2883	S	N	2N3553	2N3375	AHP	0.8	A	20	0	0.3	20	100 m	400 T	10		5/
2N2884	S	N	2N3553	2N3375	AHP	0.8	A	20	0	0.3	20	100 m	400 T	10		5/
2N2885	S	N			SH	0.15	A	15	0	0.05	30	10 m	300 T	6.0		51/
2N2886	S	N	2N2219	2N2218	A	0.8	A	40	0	0.5	22	5.0 m				5/
2N2887	S	N			AHP	25	C	80	0	1.2	15	.35 A	140 T	30		
2N2888				TABLE7	THY											
2N2889				TABLE7	THY											
2N2890	S	N	2N3507	2N3506	AP	0.8	A	80	0		30	1.0 A	30 T	70	300/1500	5/
2N2891	S	N	2N3507	2N3506	SP	0.8	A	80	0		50	1.0 A	30 T	70	300/1500	5/
2N2892	S	N	2N5477	2N5477	SP	30	C	80	0	5.0	30	1.0 A	30 T	70	300/1500	
2N2893	S	N	2N5478	2N5477	SP	30	C	80	0	5.0	50	1.0 A	30 T	70	300/1500	
★2N2894	S	P		2N2894	S	0.36	A	12	0	0.2	40	30 m	400 T	6.0	60/90	18/22
2N2894A	S	P	MM2894A	MM2894A	SP	0.36	A	12	S	0.2	40	30 m	800 T	4.5	60/35	18/
★2N2895	S	N		2N2895	S	0.5	A	65	0	1.0	40	150 m	120 T	15		18/22
★2N2896	S	N		2N2895	S	0.5	A	90	0	1.0	60	150 m	120 T	15		18/22
2N2897	S	N		2N2895	S	0.5	A	45	0	1.0	50	150 m	120 T	15		18/22
2N2898	S	N			S	0.5	A	65	0	1.0	40	150 m	120 T	15		46/
2N2899	S	N			S	0.5	A	90	0	1.0	60	150 m	120 T	15		46/
2N2900	S	N			S	0.5	A	45	0	1.0	50	150 m	120 T	15		46/
2N2901	S	N			SC	0.36	A	10	0	0.02	30	10 m	300 T	5.0	1500/	
2N2902	S	N	2N5430	2N5427	AP	40	C	120	0	0.75	30	500 m	2.0 T			
★2N2903	S	N		2N2903	AM	0.6	C	30	0	0.05	125	1.0 m	60 T	8.0		78/654
★2N2903A	S	N		2N2903	AM	0.6	C	30	0	0.05	125	1.0 m	60 T	8.0		78/654
★2N2904	S	P		2N2904	SH	3.0	C	40	0	0.6	40	150 m	200 T	8.0	45/100	5/31
★2N2904A	S	P		2N2904	SH	3.0	C	60	0	0.6	40	150 m	200 T	8.0	45/100	5/31
★2N2905	S	P		2N2904	SH	3.0	C	40	0	0.6	100	150 m	200 T	8.0	45/100	5/31
★2N2905A	S	P		2N2905A	SH	3.0	C	60	0	0.6	100	150 m	200 T	8.0	45/100	5/31
★2N2906	S	P		2N2904	SH	1.8	C	40	0	0.6	40	150 m	200 T	8.0	45/100	18/22
★2N2906A	S	P		2N2904	SH	1.8	C	60	0	0.6	40	150 m	200 T	8.0	45/100	18/22
★2N2907	S	P		2N2904	SH	1.8	C	40	0	0.6	100	150 m	200 T	8.0	45/100	18/22
★2N2907A	S	P		2N2904	SH	1.8	C	60	0	0.6	100	150 m	200 T	8.0	45/100	18/22
2N2908	S	N	2N5069	2N5067	AP	75	C	80	R	5.0	12	1.0 A	12 E			18/22
2N2909	S	N	2N2221A	2N2218	SH	0.4	A	40	0	1.0	40	.15 A	50 T	20		53/
2N2910	S	N	2N3409	2N3409	AM	0.3	A	25	0		70	0.1 m	11 T	12		46/
2N2911	S	N	2N5682	2N5682	SP	5.0	C	125	0	3.0	20	1.0 A	1.0 T		2000/3000	5/
★2N2912	G	P		2N2912	SP	75	C	6	0	25	75	10 A	20 T		200/2000	/8
★2N2913	S	N		2N2913	AM	0.3	A	45	0	0.03	60	10 *	60 T	6.0		/654
★2N2914	S	N		2N2913	AM	0.3	A	45	0	0.03	150	10 *	60 T	6.0		/654
★2N2915	S	N		2N2213	AM	0.3	A	45	0	0.03	60	10 *	60 T	6.0		/654
2N2915A	S	N			A	0.3	A	45	0	0.03			60 T	6.0		
★2N2916	S	N		2N2913	AM	0.3	A	45	0	0.03	150	10 *	60 T	6.0		/654
2N2916A	S	N			A	0.3	A	45	0	0.03			60 T	6.0		/654
★2N2917	S	N		2N2913	AM	0.3	A	45	0	0.03	60	10 *	60 T	6.0		/654
★2N2918	S	N		2N2913	AM	0.3	A	45	0	0.03	150	10 *	60 T	6.0		/654
★2N2919	S	N		2N2913	AM	0.3	A	60	0	0.03	60	10 *	60 T	6.0		

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N2919A	S	N			A	0.3	A	60	0	0.03			60 T	6.0		
★2N2920	S	N		2N2913	AM	0.3	A	60	0	0.03	150	10 *	60 T	6.0		/654
2N2920A	S	N			A	0.3	A	60	0	0.03			60 T			
2N2921	S	N			A	0.2	A	25	0	0.1				12		
2N2922	S	N	MPS6512	MPS6512	A	0.2	A	25	0	0.1				12		
2N2923	S	N	MPS2923	MPS2923	A	0.2	A	25	0	0.1				12		92/
2N2924	S	N	MPS2924	MPS2923	A	0.2	A	25	0	0.1				12		92/
2N2925	S	N	MPS2925	MPS2923	A	0.2	A	25	0	0.1				12		92/
2N2926	S	N	MPS2926	MPS2926	A	0.2	A	18	0	0.1				12		92/
2N2927	S	P		2N2696	S	0.8	A	25	0	0.5	30	50 m	100 T	20		5/
2N2928	G	P			AH	0.15	A	13	0	0.1	0.8	2.0 m	400 T	2.5		5/31
★2N2929	G	P		2N2929	AH	0.75	C	10	0	0.1	10	10 m	800 T	2.5		5/
2N2930	G	P	2N3427	2N3427	S	0.25	A	12	0	0.5	60	10 m	3.2 T	12		
2N2931	S	N			A	0.05	A	5	0	0.05	50	50 m	20 T	12		
2N2932	S	N			A	0.05	A	5	0	0.05	70	50 m	20 T	12		
2N2933	S	N			A	0.05	A	5	0	0.05	50	50 m	20 T	12		
2N2934	S	N			A	0.05	A	30	0	0.05	50	50 m	20 T	11		
2N2935	S	N			A	0.05	A	30	0	0.05	70	50 m	20 T	11		
2N2936	S	N	2N930A	2N929	A	0.3	A	55	0	0.03	100	10 *	30 T	8.0		
2N2937	S	N	2N930A	2N929	A	0.3	A	55	0	0.03	100	10 *	30 T	8.0		
2N2938	S	N	2N2369A	2N2369A	SH	0.3	A	13	0	0.5	30	50 m	500 T	4.0	30/30	18/
2N2939	S	N	2N2193	2N2192	AHP	0.8	A	60	0	1.0	60	.15 A	150 T	12		5/
2N2940	S	N	2N3019	2N3019	AHP	0.8	A	80	0	1.0	60	.15 A	150 T	12		5/
2N2941	S	N	2N3501	2N3498	AHP	0.8	A	100	0	1.0	60	.15 A	150 T	12		5/
2N2942	G	P			SH	0.15	A	25	0	0.1	50	10 m	150 T		35/145	9/
2N2943	G	P			SH	0.15	A	15	0	0.1	30	10 m	120 T		45/175	
★2N2944	S	P		2N2944	SC	0.4	A	10	0	0.1	80	1.0 m	10 T	10		46/26
2N2944A	S	P			SC	0.4	A	10	0	0.1	100	1.0 m	15 T	10		46/
★2N2945	S	P		2N2944	SC	0.4	A	20	0	0.1	40	1.0 m	5.0 T	10		46/26
2N2945A	S	P			SC	0.4	A	20	0	0.1	100	1.0 m	10 T	10		46/
★2N2946	S	P		2N2944	SC	0.4	A	35	0	0.1	30	1.0 m	3.0 T	10		46/26
2N2946A	S	P			SC	0.4	A	35	0	0.1	50	1.0 m	5.0 T	10		46/
★2N2947	S	N		2N2947	AP	25	C	60	S	1.5	2.5	0.4 A	100 T	60		3/1
★2N2948	S	N		2N2947	AP	25	C	40	S	1.5	2.5	0.4 A	100 T	60		3/1
★2N2949	S	N		2N2949	AP	6.0	C	60	S	0.7	5.0	40 m	100 T	20		107/23
★2N2950	S	N		2N2949	AP	6.0	C	60	S	0.7	5.0	40 m	100 T	20		102/24
★2N2951	S	N		2N2951	AP	3.0	C	60	S	0.25	20	10 m	200 T	8.0		5/31
★2N2952	S	N		2N2951	AP	1.8	C	60	S	0.25	20	10 m	200 T	8.0		18/22
2N2953	G	P	2N1194	2N1191	A	0.12	A	25	R	0.15	100	50 m				1/
2N2954	S	N	2N834	2N834	SH	0.2	A	20	0	0.5	25	2.0 m	300 T	3.8		
★2N2955	G	P		2N2955	SH	0.15	A	40	B	0.1	20	50 m	200 T	4.0	55/80	18/22
★2N2956	G	P		2N2955	SH	0.15	A	40	B	0.1	40	50 m	250 T	4.0	45/90	18/22
★2N2957	G	P		2N2955	SH	0.15	A	40	B	0.1	60	10 m	300 T	4.0	40/95	18/22
★2N2958	S	N		2N2958	SH	3.0	C	20	0	0.6	40	150 m	250 T	8.0	95/500	5/
★2N2959	S	N		2N2958	SH	3.0	C	20	0	0.6	100	150 m	250 T	8.0	95/500	5/31
2N2960	S	N	2N2219A	2N2218	SH	3.0	C	30	0	0.6	100	150 m	250 T	8.0	95/500	5/
2N2961	S	N	2N2219A	2N2218	SH	3.0	C	30	0	0.6	100	150 m	250 T	8.0	95/500	5/
2N2962	G	P			AP	0.35	A	18	0	0.3			660 T	10		
2N2963	G	P			AP	0.35	A	18	0	0.3			660 T	10		
2N2964	G	P			AP	0.35	A	15	0	0.3			660 T	10		
2N2965	G	P			AHP	0.35	A	15	0	0.3			660 T	10		
2N2966	G	P	2N3283	2N3283	AH	0.06	A	20	0	0.1	8.0	3.0 m	500 T	1.5		
2N2967	S	N	2N929	2N929	SH	0.3	A	6	0		20	10 m	400 T	3.0	15/15	18/
2N2968	S	P	2N3250	2N3250	S	0.15	A	10	0	0.05	15	100 *	8.0 T	6.0		5/
2N2969	S	P	2N3250	2N3250	S	0.15	A	10	0	0.05	15	100 *	8.0 T	6.0		18/
2N2970	S	P	2N3250	2N3250	S	0.15	A	20	0	0.05	10	100 *	4.0 T	6.0		5/
2N2971	S	P	2N3250	2N3250	S	0.15	A	20	0	0.05	10	100 *	4.0 T	6.0		18/
2N2972	S	N		2N2913	AM	0.25	A	45	0	0.03	60	10 *	60 T	6.0		
2N2973	S	N		2N2913	AM	0.25	A	45	0	0.03	150	10 *	60 T	6.0		
2N2974	S	N		2N2913	AM	0.25	A	45	0	0.03	60	10 *	60 T	6.0		
2N2975	S	N		2N2913	AM	0.25	A	45	0	0.03	150	10 *	60 T	6.0		
2N2976	S	N		2N2913	AM	0.25	A	45	0	0.03	60	10 *	60 T	6.0		
2N2977	S	N		2N2913	AM	0.25	A	45	0	0.03	150	10 *	60 T	6.0		
2N2978	S	N		2N2913	AM	0.25	A	60	0	0.03	60	10 *	60 T	6.0		
2N2979	S	N		2N2913	AM	0.25	A	60	0	0.03	150	10 *	60 T	6.0		
2N2980	S	N	2N2060A	2N2060	AM	0.25	A	60	0	0.5	25	10 *	60 T	15		
2N2981	S	N	2N2223	2N2060	AM	0.25	A	60	0	0.5	50	10 m	50 T	15		
2N2982	S	N	2N2223A	2N2060	AM	0.25	A	60	0	0.5	50	10 m	50 T	15		
2N2983	S	N	2N5335	2N5334	AP	1.0	A	80	0		20	500 m	60 T			
2N2984	S	N	2N5682	2N5681	AP	1.0	A	120	0		20	500 m	60 T			

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}-Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N2985	S	N	2N5338	2N5336	AP	1.0	A	80	0		40	500 m	60 T			
2N2986	S	N			AP	1.0	A	120	0		40	500 m	60 T			
2N2987	S	N	2N4238	2N4237	AP	1.0	A	80	0	1.0	25	200 m	30 T			5/
2N2988	S	N	2N5681	2N5681	AP	1.0	A	100	0	1.0	25	200 m	30 T			5/
2N2989	S	N	2N5337	2N5336	AP	1.0	A	80	0	1.0	60	200 m	30 T			5/
2N2990	S	N	2N5339	2N5336	AP	1.0	A	100	0	1.0	60	200 m	30 T			5/
2N2991	S	N	2N5447	2N5447	AP	2.0	A	80	0	1.0	25	200 m	30 T			5/
2N2992	S	N	2N5479	2N5477	AP	2.0	A	100	0	1.0	20	1.0 m	30 T			
2N2993	S	N	2N5478	2N5477	AP	2.0	A	80	0	1.0	60	200 m	30 T			
2N2994	S	N	2N5480	2N5477	AP	2.0	A	100	0	1.0	60	200 m	30 T			
2N2995	S	N			AHP	1.5	A	100	0	1.0	25	0.2 A	10 T	75		
2N2996	G	P			AH	0.075	A	10	0	0.05	25	4.0 m	400 T	3.0		
2N2997	G	P			AH	0.075	A	15	0	0.05	40	4.0 m	400 T	1.8		
2N2998	G	P			AH	0.075	A	12	0	0.02	15	3.0 m	600 T	1.7		
2N2999	G	P	2N3283	2N3283	AH	0.075	A	10	0	0.02	10	3.0 m	1400 T	1.7		
2N3001				TABLE7	THY											
THRU																
2N3008				TABLE7	THY											
★2N3009	S	N		2N3009	SH	0.36	A	15	0	0.2	30	30 m	350 T	5.0	15/25	52/27
★2N3010	S	N		2N3010	SH	0.3	A	6	0	0.05	25	10 m	600 T	3.0	12/12	18/22
★2N3011	S	N		2N3011	SH	0.36	A	12	0	0.2	30	10 m	400 T	4.0	15/20	18/22
★2N3013	S	N		2N3009	SH	0.36	A	15	0	0.2	30	30 m	350 T	5.0	15/25	52/27
★2N3014	S	N		2N3009	SH	0.36	A	20	0	0.2	30	30 m	350 T	5.0	16/25	52/27
2N3015	S	N		2N5336	SH	0.8	A	30	0		30	150 m	250 T			
2N3016	S	N	2N5337	2N5336	AHP	3.33	C	50	0	2.5	60	1.0 A	200 T	50		5/
2N3017	S	N	2N5478	2N5477	AHP	3.33	C	50	0	5.0	60	1.0 A	200 T	50		
2N3018	S	N	2N5478	2N5477	AHP	25	C	50	0	10	60	1.0 A	200 T	50		
★2N3019	S	N			AH	0.8	A	80	0	1.0	100	.15 A	100 T	12		5/
★2N3020	S	N			AH	0.8	A	80	0	1.0	40	.15 A	80 T	12		5/31
★2N3021	S	P		2N3021	SHP	25	C	30	0	3.0	20	1.0 A	60 T		100/175	3/11
★2N3022	S	P		2N3021	SHP	25	C	45	0	3.0	20	1.0 A	60 T		100/175	3/11
★2N3023	S	P		2N3021	SHP	25	C	60	0	3.0	20	1.0 A	60 T		100/175	3/11
★2N3024	S	P		2N3021	SHP	25	C	30	0	3.0	50	1.0 A	60 T		100/175	3/11
★2N3025	S	P		2N3021	SHP	25	C	45	0	3.0	50	1.0 A	60 T		100/175	3/11
★2N3026	S	P		2N3021	SHP	25	C	60	0	3.0	50	1.0 A	60 T		100/175	3/11
2N3027				TABLE7	THY											
THRU																
2N3032				TABLE7	THY											
2N3033	S	N			AL	0.3	A	100	R	0.2				6.0		18/
2N3034	S	N			AL	0.3	A	70	R	0.2				6.0		18/
2N3035	S	N			AL	0.3	A	50	R	0.2				6.0		18/
2N3036	S	N			A	0.8	A	80	0	1.2	50	150 m	50 T	15	180/1200	5/
2N3037	S	N	2N3036	2N3036	A	0.36	A	70	0	0.5	40	150 m	50 T	15	180/1200	
2N3038	S	N			A	0.36	A	60	0	0.5	80	150 m	50 T	15	180/1200	
2N3039	S	P			A	0.36	A	35	0	0.5	20	150 m	50 T	40	150/650	
2N3040	S	P			A	0.36	A	30	0	0.5	40	150 m	50 T	40	150/650	
★2N3043	S	N		2N3043	AM	0.25	A	45	0	0.03	100	10 *	30 T	8.0		/610
★2N3044	S	N		2N3043	AM	0.25	A	45	0	0.03	100	10 *	30 T	8.0		/610
★2N3045	S	N		2N3043	A	0.25	A	45	0	0.03	100	10 *	30 T	8.0		/610
★2N3046	S	N		2N3043	AM	0.25	A	45	0	0.03	50	10 *	30 T	8.0		/610
★2N3047	S	N		2N3043	AM	0.25	A	45	0	0.03	50	10 *	30 T	8.0		/610
★2N3048	S	N		2N3043	A	0.25	A	45	0	0.03	50	10 *	30 T	8.0		/610
2N3049	S	P		MD3250AF	AM	0.25	A	20	0	0.1	20	10 *	60 T	8.0		
2N3050	S	P		MD3250AF	AM	0.25	A	20	0	0.1	20	10 *	60 T	8.0		
2N3051	S	P		MD3250AF	A	0.25	A	20	0	0.1	20	10 *	60 T	8.0	35/150	
2N3052	S	N			SH	0.25	A	15	0	0.2	25	10 m	200 T	8.0	62/55	
★2N3053	S	N		2N3053	SH	5.0	C	40	0	0.7	50	.15 A	100 T	15		5/31
★2N3053A	S	N			SP	5.0	C	60	0	0.7	50	150 m	100 T	15		5/31
2N3054	S	N		2N3054	AP	25	C	60	R	4.0	25	0.5 A	0.75 E			
★2N3054A	S	N			AP	75	C	60	R	4.0	25	0.5 A	0.75 E			66/80
★2N3055A	S	N		2N3055	AP	115	C	70	R	15	20	4.0 A	0.4 E			3/
2N3056	S	N			AH	0.4	A	60	0	1.0	40	.15 A	80 T	12		46/
2N3056A	S	N			AH	0.4	A	80	0	1.0	40	.15 A	80 T	12		46/
2N3057	S	N			AH	0.4	A	60	0	1.0	100	.15 A	100 T	12		46/
2N3057A	S	N			AH	0.4	A	80	0	1.0	100	.15 A	100 T	12		46/
2N3058	S	P			A	0.4	A	6	0	0.1	40	100 n		10		46/
2N3059	S	P			A	0.4	A	10	0	0.1	100	10 *		10		46/
2N3060	S	P			A	0.4	A	60	0	0.1	30	1.0 m		10		46/
2N3061	S	P			A	0.4	A	60	0	0.1	60	1.0 m		10		46/
2N3062	S	P			A	0.4	A	80	0	0.1	20	1.0 m		10		46/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N3063	S	P			A	0.4	A	80	0	0.1	50	1.0 m		10		46/
2N3064	S	P			A	0.4	A	100	0	0.1	15	1.0 m		10		46/
2N3065	S	P			A	0.4	A	100	0	0.1	30	1.0 m		10		46/
2N3066,A THRU				TABLE8	FET											
2N3071				TABLE8	FET											
★2N3072	S	P		2N3072	S	0.8	A	60	0	0.5	30	50 m	130 T	10	40/100	39/79
★2N3073	S	P		2N3072	S	0.36	A	60	0	0.5	30	50 m	130 T	10	40/100	18/22
2N3074	G	P			AH	0.14	A	25	S	0.02	25	3.5 m		3.0		12/
2N3075	G	P			AH	0.14	A	25	S	0.02	20	3.0 m		3.0		12/
2N3076	S	N	MJ7000	MJ7000	SHP	125	C	50	0	10	30	7.0 A	50 T		500/3500	
2N3077	S	N			A	0.36	A	60	0	0.05	100	10 *	15 T	6.0		18/
2N3078	S	N			A	0.36	A	60	0	0.05	40	10 *	15 T	6.0		18/
2N3079	S	N	2N5241	2N5241	SP	178	C	200	0	0.05	7.0	5.0 A	2.1 E			
2N3080	S	N	2N5241	2N5241	SP	178	C	300	0		7.0	5.0 A	2.1 E			
★2N3081	S	P	2N2193	2N2192	SH	0.6	A	50	0	0.6	20	500 m	150 T	13	60/175	5/31
2N3082	S	N			SC	0.5	A	7	0	0.1	100	.25 m	100 T	8.0		
2N3083	S	N			SC	0.5	A	7	0	0.1	100	.25 m	100 T	8.0		
2N3084 THRU				TABLE8	FET											
2N3089,A				TABLE8	FET											
2N3091 THRU				TABLE7	THY											
2N3106				TABLE7	THY											
2N3107	S	N			S	0.8	A	60	0		100	.15 A	70 T			
2N3108	S	N			S	0.8	A	60	0	1.0	40	150 m	60 T	20	200/600	5/
2N3109	S	N			S	0.8	A	40	0		100	.15 A	70 T			
2N3110	S	N	2N2193	2N2193	S	0.8	A	40	0	1.0	40	150 m	60 T	25	200/600	5/
2N3112				TABLE8	FET											
2N3113				TABLE8	FET											
★2N3114	S	N		2N3114	AH	0.8	A	150	0	02	30	30 m	40 T	9.0		5/31
★2N3115	S	N		2N2958	SH	0.4	A	20	0	0.6	40	.15 A	250 T	8.0	95/500	18/22
★2N3116	S	N		2N2958	SH	0.4	A	20	0	0.6	100	.15 A	250 T	8.0	95/500	18/22
2N3117	S	N	2N930A	2N929	A	0.36	A	60	0	0.05	250	10 *	60 T	4.5		18/
2N3118	S	N			AH	1.0	A	60	0	0.05	50	25 m	250 T	6.0		5/
2N3119	S	N	2N3501	2N3498	SH	1.0	A	80	0	0.05	50	100 m	250 T	6.0	20/	5/
★2N3120	S	P		2N3120	S	0.8	A	45	0	0.5	30	50 m	130 T	10	40/100	39/79
★2N3121	S	P		2N3120	S	0.36	A	45	0	0.5	30	50 m	130 T	10	40/100	18/
2N3122	S	N	2N2219A	2N2218	A	0.8	A	30	0	0.5	25	300 m	60 T	25		5/
2N3123	S	N	2N2219A	2N2218	SH	0.8	A	30	0	0.8	100	.15 A	400 T	8.0		5/
2N3124	G	P			AP	90	C	30	S	15	50	10 A	0.125 E			41/
2N3125	G	P			AP	90	C	80	S	3.3	30	3.0 A	0.15 E			41/
2N3126	G	P			AP	90	C	75	S	15	10	10 A	0.06 E			41/
★2N3127	G	P		2N3127	AH	0.1	A	20	0	0.05	20	3.0 m	400 T	1.2		72/20
2N3128	S	N			A	0.15	A	20	0	0.1	50	0.1 m	60 T	6.0		
2N3129	S	N			A	0.15	A	45	0	0.1	100	10 n	60 T	6.0		
2N3130	S	N			A	0.15	A	60	0	0.1	60	10 n	60 T	6.0		
2N3131	S	N			SH	0.15	A	15	0	0.1	30	10 m	250 T	4.0	35/75	
2N3132	G	P			SP	90	C	70	S	5.0	40	2.0 A	0.003 T		20k/20k	3/
★2N3133	S	P		2N3133	SH	0.6	A	35	0	0.6	40	.15 A	200 T	10	75/150	5/31
★2N3134	S	P		2N3133	SH	0.6	A	35	0	0.6	100	.15 A	200 T	10	75/150	5/
★2N3135	S	P		2N3133	SH	0.4	A	35	0	0.6	40	.15 A	200 T	10	75/150	18/22
★2N3136	S	P		2N3133	SH	0.4	A	35	0	0.6	100	.15 A	200 T	10	75/150	18/
★2N3137	S	N		2N3137	AH	0.6	A	20	0	0.15			500 T	3.5		5/31
2N3138	S	N	2N5477	2N5477	AHP	20	C	65	0	2.0	10	1.0 A	100 T	30		
2N3139	S	N			AHP	20	C	140	0	2.0	10	1.0 A	100 T	30		
2N3140	S	N	2N5477	2N5477	AHP	20	C	65	0	2.0	10	1.0 A	100 T	30		
2N3141	S	N			AHP	20	C	140	0	2.0	10	1.0 A	100 T	30		
2N3142	S	N	2N5477	2N5477	AHP	25	C	65	0	2.0	10	1.0 A	100 T	30		
2N3143	S	N			AHP	25	C	140	0	2.0	10	1.0 A	100 T	30		
2N3144	S	N	2N5477	2N5477	AHP	25	C	65	0	2.0	10	1.0 A	100 T	30		
2N3145	S	N			AHP	25	C	140	0	2.0	10	1.0 A	100 T	30		
2N3146	G	P	2N3616	2N3615	AP	150	C	140	V	15	30	5.0 A	0.2 T			3/
2N3147	G	P	2N3616	2N3615	AP	150	C	160	V	15	30	5.0 A	0.2 T			3/
2N3148	G	P			S		A	6	0	0.05	70	20 m	25 T	6.0		24/
2N3149	S	N			SP	300	C	80	0	70	10	50 A	0.1 T		10k/20k	
2N3150	S	N			SP	300	C	100	0	70	10	50 A	0.1 T		10k/20k	
2N3151	S	N			SP	300	C	150	0	70	10	50 A	0.1 T		10k/20k	
2N3152	S	N			SH	0.025	C	120	0	0.1	40	30 m	200 T	10		
2N3153	S	N			SC	0.3	A	15	0	0.1			30 T	8.0		18/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N3154	G	P			SP	37.5	C	25	0	3.0	60	0.5 A	0.9 E		10k/20k	
2N3155	G	P			SP	37.5	C	40	0	3.0	60	0.5 A	0.9 E		10k/20k	
2N3156	G	P			SP	37.5	C	55	0	3.0	60	0.5 A	0.9 E		10k/20k	
2N3157	G	P			SP	37.5	C	65	0	3.0	60	0.5 A	0.9 E		10k/20k	
2N3158	G	P			SP	37.5	C	25	0	3.0	30	0.5 A	0.3 E		10k/20k	
2N3159	G	P			SP	37.5	C	40	0	3.0	30	0.5 A	0.3 E		10k/20k	
2N3160	G	P			SP	37.5	C	55	0	3.0	30	0.5 A	0.3 E		10k/20k	
2N3161	G	P			SP	37.5	C	65	0	3.0	30	0.5 A	0.3 E		10k/20k	
2N3162	S	N	2N3411	2N3409	AM	0.3	A	25	0		50	10 m	300 T	6.0		
2N3163	S	P			AHP	85	C	40	0	3.0	12	1.0 A	1.0 T			
2N3164	S	P			AHP	85	C	60	0	3.0	12	1.0 A	1.0 T			
2N3165	S	P			AHP	85	C	80	0	3.0	12	1.0 A	1.0 T			
2N3166	S	P			AHP	85	C	100	0	3.0	12	1.0 A	1.0 T			
2N3167	S	P	2N4901	2N4901	AHP	85	C	40	0	3.0	12	1.0 A	1.0 T			53/
2N3168	S	P	2N4902	2N4901	AHP	85	C	60	0	3.0	12	1.0 A	1.0 T			53/
2N3169	S	P	2N4903	2N4901	AHP	85	C	80	0	3.0	12	1.0 A	1.0 T			53/
2N3170	S	P			AHP	85	C	100	0	3.0	12	1.0 A	1.0 T			53/
2N3171	S	P			AHP	75	C	40	0	3.0	12	1.0 A	1.0 T			3/
2N3172	S	P			AHP	75	C	60	0	3.0	12	1.0 A	1.0 T			3/
2N3173	S	P			AHP	75	C	80	0	3.0	12	1.0 A	1.0 T			3/
2N3174	S	P			AHP	75	C	100	0	3.0	12	1.0 A	1.0 T			3/
2N3175	S	P	2N6182	2N6182	AHP	85	C	40	0	5.0	10	2.0 A	1.0 T			
2N3176	S	P	2N6182	2N6182	AHP	85	C	60	0	5.0	10	2.0 A	1.0 T			
2N3177	S	P	2N6182	2N6182	AHP	85	C	80	0	5.0	10	2.0 A	1.0 T			
2N3178	S	P	2N6184	2N6182	AHP	85	C	100	0	5.0	10	2.0 A	1.0 T			
2N3179	S	P	2N4910	2N4910	AHP	85	C	40	0	5.0	10	2.0 A	1.0 T			53/
2N3180	S	P	2N4911	2N4910	AHP	85	C	60	0	5.0	10	2.0 A	1.0 T			53/
2N3181	S	P	2N4912	2N4910	AHP	85	C	80	0	5.0	10	2.0 A	1.0 T			53/
2N3182	S	P	2N3790		AHP	85	C	100	0	5.0	10	2.0 A	1.0 T			53/
2N3183	S	P			AHP	75	C	40	0	5.0	10	2.0 A	1.0 T			3/
2N3184	S	P			AHP	75	C	60	0	5.0	10	2.0 A	1.0 T			3/
2N3185	S	P			AHP	75	C	80	0	5.0	10	2.0 A	1.0 T			3/
2N3186	S	P			AHP	75	C	100	0	5.0	10	2.0 A	1.0 T			3/
2N3187	S	P	2N6182	2N6182	AHP	85	C	40	0	5.0	10	3.0 A	1.0 T			
2N3188	S	P	2N6182	2N6182	AHP	85	C	60	0	5.0	10	3.0 A	1.0 T			
2N3189	S	P	2N6182	2N6182	AHP	85	C	80	0	5.0	10	3.0 A	1.0 T			
2N3190	S	P	2N6184	2N6182	AHP	85	C	100	0	5.0	10	3.0 A	1.0 T			
2N3191	S	P	2N4910	2N4910	AHP	85	C	40	0	5.0	10	3.0 A	1.0 T			53/
2N3192	S	P	2N4911	2N4910	AHP	85	C	60	0	5.0	10	3.0 A	1.0 T			53/
2N3193	S	P	2N4912	2N4910	AHP	85	C	80	0	5.0	10	3.0 A	1.0 T			53/
2N3194	S	P	2N6226	2N6226	AHP	85	C	100	0	5.0	10	3.0 A	1.0 T			53/
2N3195	S	P			AHP	75	C	40	0	5.0	10	3.0 A	1.0 T			3/
2N3196	S	P			AHP	75	C	60	0	5.0	10	3.0 A	1.0 T			3/
2N3197	S	P			AHP	75	C	80	0	5.0	10	3.0 A	1.0 T			3/
2N3198	S	P			AHP	75	C	100	0	5.0	10	3.0 A	1.0 T			3/
2N3199	S	P	2N6192	2N6190	AHP	40	C	40	0	3.0	20	1.0 A	1.0 T			
2N3200	S	P	2N6192	2N6190	AHP	40	C	60	0	3.0	20	1.0 A	1.0 T			
2N3201	S	P	2N6192	2N6190	AHP	40	C	80	0	3.0	20	1.0 A	1.0 T			
2N3202	S	P	2N3202		AHP	8.8	C	40	0	3.0	20	1.0 A	1.0 T			5/
2N3203	S	P	2N3203		AHP	8.8	C	60	0	3.0	20	1.0 A	1.0 T			5/
2N3204	S	P	2N3204		AHP	8.8	C	80	0	3.0	20	1.0 A	1.0 T			5/
2N3205	S	P	2N6182	2N6182	AHP	40	C	40	0	2.0	20	0.5 A	1.0 T			
2N3206	S	P	2N6182	2N6182	AHP	40	C	60	0	2.0	20	0.5 A	1.0 T			
2N3207	S	P			AHP	40	C	100	0	2.0	20	0.5 A	1.0 T			
2N3208	S	P			AHP	8.8	C	40	0	2.0	20	0.5 A	1.0 T			5/
2N3209	S	P			S	0.36	A	20	0	0.2	30	30 m	400 T	5.0	60/90	18/
★2N3210	S	N		2N3210	SH	0.36	A	15	0	0.5	30	10 m	300 T	6.0	40/40	18/22
★2N3211	S	N		2N3211	SH	0.36	A	15	0	0.5	50	10 m	350 T	4.0		18/22
2N3212	G	P			AP	14	C	80	0	5.0	30	3.0 A			6000/9000	37/
2N3213	G	P			AP	14	C	60	0	5.0	30	3.0 A			6000/9000	37/
2N3214	G	P			AP	14	C	40	0	5.0	30	3.0 A			6000/9000	37/
2N3215	G	P			AP	14	C	30	0	5.0	25	3.0 A			6000/9000	37/
2N3216	G	P			S	0.15	A	10	0	0.5	60	200 m	10 T	20	50/350	5/
2N3217	S	P	2N2944	2N2944	SC	0.4	A	10	0	0.1	40	5.0 m	1.0 T	14		46/
2N3218	S	P	2N2945	2N2944	SC	0.4	A	20	0	0.1	30	5.0 m	1.0 T	14		46/
2N3219	S	P	2N2945	2N2944	SC	0.4	A	35	0	0.1	20	5.0 m	1.0 T	14		46/
2N3220	S	N	2N5477	2N5477	AHP	6.0	C	80	0	2.0	20	1.0 A	10 T	180		
2N3221	S	N	2N5477	2N5477	AHP	6.0	C	80	0	2.0	40	1.0 A	10 T	180		
2N3222	S	N	2N5477	2N5477	AHP	6.0	C	60	0	2.0	20	1.0 A	10 T	180		
2N3223	S	N	2N5479	2N5477	AHP	6.0	C	60	0	2.0	40	1.0 A	10 T	180		

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N3224	S	P	2N3498	2N3498	AH	0.7	A	100	0		20	50 m	60 T	20		5/
2N3225	S	P	2N3498	2N3498	AH	0.7	A	100	0		40	50 m	80 T	20		5/
2N3226	S	N	2N5873	2N5871	AP	75	C	35	0	5.0	20	2.0 A	30 T			3/
★2N3227	S	N		2N2369	SH	0.36	A	20	0	0.5	100	10 m	500 T	4.0	12/18	18/22
2N3228				TABLE7	THY											
2N3229	S	N			AHP	17.5	C	60	0	2.5	5.0	2.5 A	150 T	20		
2N3230	S	N			SHP	25	C	60	0	7.0	2k	2.0 A	40 T	60	350/2150	
2N3231	S	N			SHP	25	C	80	0	7.0	2k	2.0 A	40 T	60	350/2150	
★2N3232	S	N		2N3232	AHP	117	C	60	0	7.5	18	3.0 A	0.36 E			/1
2N3233	S	N			AHP	117	C	100	0	7.5	18	3.0 A	0.36 E			
2N3234	S	N			AHP	117	C	160	0	7.5	18	3.0 A	0.36 E			
★2N3235	S	N		2N3232	AHP	117	C	55	0	15	20	4.0 A	20 E			/1
2N3236	S	N			AHP	150	C	90	0	15	17	5.0 A	17 E			
2N3237	S	N			AHP	200	C	75	0	20	12	10 A	12 E			
2N3238	S	N			AHP	150	C	80	0	15	8.5	10 A	8.5 E			
2N3239	S	N	2N5882	2N5879	AHP	150	C	80	0	15	8.5	10 A	8.5 E			
2N3240	S	N	2N5631	2N5629	AHP	150	C	160	0	15	8.5	10 A	8.5 E			
2N3241	S	N	2N2219	2N2218	A	0.5	A	25	0	0.1	50	10 m	50 T	30		
2N3241A	S	N			A	0.5	A	25	0	0.2			100 T	20		
2N3242	S	N			A	0.5	A	25	0	0.2	75	10 m	50 T	30		
2N3242A	S	N			A	0.5	A	40	0	0.3			100 T	20		
★2N3244	S	P		2N3244	SH	1.0	A	40	0	1.0	50	0.5 A	175 T	25	50/185	5/31
★2N3245	S	P		2N3244	SH	1.0	A	50	0	1.0	30	0.5 A	150 T	25	55/165	5/31
2N3246	S	N	2N930A	2N929	SH	0.35	A	45	0	0.05	200	10 *	60 T	5.0		18/
2N3247	S	N	2N930A	2N929	SH	0.15	A	45	0	0.05	200	10 *	60 T	5.0		
★2N3248	S	P		2N3248	SH	0.36	A	12	0	0.2	50	0.1 m	250 T	8.0	90/100	18/22
★2N3249	S	P		2N3248	SH	0.36	A	12	0	0.2	100	0.1 m	300 T	8.0	90/100	18/22
★2N3250	S	P		2N3250	SH	0.36	A	40	0	0.2	50	10 m	250 T	6.0	70/225	18/22
★2N3250A	S	P		2N3250	SH	0.36	A	60	0	0.2	50	10 m	250 T	6.0	70/225	18/22
★2N3251	S	P		2N3250	SH	0.36	A	40	0	0.2	100	10 m	300 T	6.0	70/250	18/22
★2N3251A	S	P		2N3250	SH	0.36	A	60	0	0.2	100	10 m	300 T	6.0	70/250	18/22
★2N3252	S	N		2N3252	SH	1.0	A	30	0	1.0	30	0.5 A	200 T	12	45/70	5/31
★2N3253	S	N		2N3252	SH	1.0	A	40	0	1.0	25	375 m	175 T	12	50/90	5/31
2N3254				TABLE7	THY											
THRU																
2N3259				TABLE7	THY											
2N3260	S	N			SP	200	C	200	0	30	10	20 A	0.6 T		6k/10k	
2N3261	S	N			SH	0.3	A	15	0	0.5	40	10 m	600 T	3.5	13/16	52/
2N3262	S	N			SH	8.75	C	80	0	1.5	40	0.5 A	150 T	20	40/750	39/
2N3263	S	N			SP	75	C	90	0	25	20	15 A	20 T		500/2000	
2N3264	S	N			SP	75	C	60	0	25	20	15 A	20 T		500/2000	
2N3265	S	N	MJ7000	MJ7000	SP	125	C	90	0	25	20	15 A	20 T		500/2000	
2N3266	S	N	MJ7000	MJ7000	SP	125	C	60	0	25	20	15 A	20 T		500/2000	
2N3267	G	P			AH	0.075	A	8	0	0.02	10	3.0 m	900 T	1.7		
2N3268	S	N			A	0.15	A	45	0	0.025	12	10 m	2.0 T			5/
2N3269				TABLE7	THY											
THRU																
2N3276				TABLE7	THY											
2N3277				TABLE8	FET											
2N3278				TABLE8	FET											
★2N3279	G	P		2N3279	AH	0.1	A	20	0	0.05	10	3.0 m	600 T			
★2N3280	G	P		2N3279	AH	0.1	A	20	0	0.05	10	3.0 m	600 T			
★2N3281	G	P		2N3279	AH	0.1	A	15	0	0.05	10	3.0 m	550 T			
2N3282	G	P		2N3279	AH	0.1	A	15	0	0.05	10	3.0 m	550 T			
★2N3283	G	P		2N3283	AH	0.1	A	25	S	0.05	10	3.0 m	250 T	1.5		
★2N3284	G	P		2N3283	AH	0.1	A	25	S	0.05	10	3.0 m	250 T	1.5		72/20
★2N3285	G	P		2N3283	AH	0.1	A	20	S	0.05	5.0	3.0 m	250 T	1.5		72/20
★2N3286	G	P		2N3283	AH	0.1	A	20	S	0.05	5.0	3.0 m	250 T	1.5		72/20
★2N3287	S	N		2N3287	AH	0.2	A	20	0	0.05	15	2.0 m	350 T	1.1		72/20
2N3288	S	N		2N3287	AH	0.2	A	20	0	0.05	15	2.0 m	350 T	1.5		72/20
2N3289	S	N		2N3287	AH	0.2	A	15	0	0.05	10	2.0 m	300 T	1.5		
2N3290	S	N		2N3287	AH	0.2	A	15	0	0.05	10	2.0 m	300 T	1.5		
★2N3291	S	N		2N3291	AH	0.2	A	25	S	0.05	10	2.0 m	250 T	2.0		72/20
★2N3292	S	N		2N3291	AH	0.2	A	25	S	0.05	10	2.0 m	250 T	2.0		72/20
2N3293	S	N		2N3291	AH	0.2	A	20	S	0.05	10	2.0 m	250 T	2.0		
★2N3294	S	N		2N3291	AH	0.2	A	20	S	0.05	10	2.0 m	250 T	2.0		72/20
★2N3295	S	N		2N3295	AHP	0.8	A	60	S	0.25	20	10 m	200 T	8.0		5/31
★2N3296	S	N		2N3296	AHP	0.7	A	60	S	0.7	5.0	40 m	100 T	20		102/24
★2N3297	S	N		2N3297	AHP	25	C	60	S	1.5	6.0	0.4 A	50 T	60		3/1
★2N3298	S	N		2N3298	AHP	1.0	C	15	0	0.1	80	10 m	200 T	6.0		18/22

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
★2N3299	S	N		2N3299	SH	0.8	A	30	0	0.5	40	.15 A	250 T	8.0	60/150	5/31
★2N3300	S	N		2N3299	SH	0.8	A	30	0	0.5	100	.15 A	250 T	8.0	60/150	5/31
★2N3301	S	N		2N3299	SH	0.36	A	30	0	0.5	40	.15 A	250 T	8.0	60/150	18/22
★2N3302	S	N		2N3299	SH	0.36	A	30	0	0.5	100	.15 A	250 T	8.0	60/150	18/22
★2N3303	S	N		2N3303	SH	0.6	A	12	0	1.0	30	0.3 A	450 T	15	15/25	/94
★2N3304	S	P		2N3304	S	0.3	A	6	0		30	10 m	500 T	3.5	60/60	18/22
2N3305	S	P			A	0.6	A	40	0		40	0.1 m	20 T	30		5/
2N3306	S	P			A	0.6	A	40	0		100	0.1 m	20 T	30		5/
★2N3307	S	P		2N3307	AH	0.2	A	35	0	0.05	40	2.0 m	300 T	1.3		72/20
★2N3308	S	P		2N3307	AH	0.2	A	25	0	0.05	25	2.0 m	300 T	1.6		72/20
2N3309	S	N	2N3553	2N3375	AHP	3.5	C	50	S	0.5	5.0	30 m	300 T	10		39/
2N3309A	S	N	2N3553	2N3375	AHP	5.0	C	60	S	0.5	8.0	50 m	300 T	6.0		39/
2N3310	S	N			AHP	0.3	A	15	0	0.2	10	20 m	300 T	3.0		
★2N3311	G	P		2N3311	AP	170	C	30	S	5.0	60	3.0 A	0.06 E			36/5
★2N3312	G	P		2N3311	AP	170	C	45	S	5.0	60	3.0 A	0.06 E			36/5
★2N3313	G	P		2N3311	AP	170	C	60	S	5.0	60	3.0 A	0.06 E			36/5
★2N3314	G	P		2N3311	AP	170	C	30	S	5.0	100	3.0 A	0.1 E			36/5
★2N3315	G	P		2N3311	AP	170	C	45	S	5.0	100	3.0 A	0.1 E			36/5
★2N3316	G	P		2N3311	AP	170	C	60	S	5.0	100	3.0 A	0.1 E			36/5
2N3317	S	P			SC	0.15	A	30	0	0.05			6.4 T	9.0		
2N3318	S	P			SC	0.15	A	15	0	0.05			7.6 T	9.0		
2N3319	S	P			SC	0.15	A	6	0	0.05			12 T	10		
2N3320	G	P			SH	0.06	A	10	0	0.1	50	20 m	600 T	3.0	20/35	18/
2N3321	G	P			SH	0.06	A	7	0	0.1	100	10 m	600 T	3.5	20/35	18/
2N3322	G	P			SH	0.06	A	7	0	0.1	30	40 m	600 T	3.5	20/35	18/
★2N3323	G	P		2N3323	AH	0.15	A	35	S	0.1	30	3.0 m	200 T	3.0		18/22
★2N3324	G	P		2N3323	AH	0.15	A	35	S	0.1	30	3.0 m	200 T	3.0		18/22
★2N3325	G	P		2N3323	AH	0.15	A	35	S	0.1	30	3.0 m	200 T	3.0		18/22
2N3326	S	N	2N2218A	2N2218	SH	0.8	A	45	0	0.8	40	.15 A	250 T	8.0	45/340	5/31
2N3327	S	N			AHP	20	C	65	0	2.0	10	0.5 A	100 T	30		
2N3328				TABLE8	FET											
THRU																
2N3336				TABLE8	FET											
2N3337	S	N	2N3287	2N3287	AH	0.3	A	40	0	0.05	30	4.0 m	400 T	1.6		
2N3338	S	N	2N3289	2N3287	AH	0.3	A	40	0	0.05	30	4.0 m	400 T	1.6		
2N3339	S	N	2N3288	2N3287	AH	0.3	A	40	0	0.05	30	4.0 m	400 T	1.6		
2N3340	S	N			S	0.4	A	20	0	0.03	40	10 *	70 T	6.0		46/
2N3341	S	P			S	0.4	A	20	0	0.03	40	10 *	50 T	6.0		46/
2N3342	S	P			S	0.25	A	8	0	0.05	30	5.0 m		10	150/280	5/
2N3343	S	P			SC	0.25	A	8	0	0.05	20	.25 m	2.0 T	25		5/
2N3344	S	P			SC	0.25	A	30	0	0.05	25	1.0 m	2.0 T	25		5/
2N3345	S	P			SC	0.25	A	50	0	0.05	15	1.0 m	2.0 T	25		5/
2N3346	S	P			SC	0.25	A	50	0	0.05	25	1.0 m	2.0 T	25		5/
2N3347	S	P			AM	0.3	A	45	0	0.03	40	10 *	60 T	6.0		5/
2N3348	S	P			AM	0.3	A	45	0	0.03	40	10 *	60 T	6.0		
2N3349	S	P			AM	0.3	A	45	0	0.03	40	10 *	60 T	6.0		
2N3350	S	P			AM	0.3	A	45	0	0.03	100	10 *	60 T	6.0		
2N3351	S	P			AM	0.3	A	45	0	0.03	100	10 *	60 T	6.0		
2N3352	S	P			AM	0.3	A	45	0	0.03	100	10 *	60 T	6.0		
2N3353				TABLE7	THY											
THRU																
2N3364				TABLE7	THY											
2N3365				TABLE8	FET											
THRU																
2N3370				TABLE8	FET											
2N3371	G	P			AH	0.15	A	10	0	0.1	20	12 m	400 T	4.0		18/
2N3374	S	N	2N3500	2N3498	AHP	5.0	C	80	0	0.5	10	.17 A	230 T	10		5/
★2N3375	S	N		2N3375	AHP	11.6	C	40	0	1.5	10	.25 A	400 T	10		60/36
2N3376				TABLE8	FET											
THRU																
2N3387				TABLE8	FET											
2N3388	S	N			S	0.6	A	100	0	.0025	60	2.5 m	36 T	35	1200/1600	5/
2N3389	S	N	MPS6521	MPS6512	S	0.6	A	160	0	0.007	60	7.0 m	36 T	35	1200/1600	5/
2N3390	S	N	MPS6515	MPS6512	A	0.2	A	25	0	0.1	400	2.0 m		2.0		92/
2N3391	S	N	MPS6520	MPS6512	A	0.2	A	25	0	0.1	250	2.0 m		2.0		92/
2N3391A	S	N	MPS3392	MPS3392	A	0.2	A	25	0	0.1	250	2.0 m		10		92/
2N3392	S	N	MPS3393	MPS3392	A	0.2	A	25	0	0.1	150	2.0 m		2.0		92/
2N3393	S	N	MPS3393	MPS3392	A	0.2	A	25	0	0.1	90	2.0 m		4.5		92/
2N3394	S	N	MPS3394	MPS3392	A	0.2	A	25	0	0.1	55	2.0 m		4.5		92/
2N3395	S	N	MPS3395	MPS3392	A	0.2	A	25	0	0.1	150	2.0 m		4.5		92/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N3396	S	N	MPS3396		A	0.2	A	25	0	0.1	90	2.0 m		4.5		92/
2N3397	S	N	MPS3397		A	0.2	A	25	0	0.1	55	2.0 m		4.5		92/
2N3398	S	N	MPS3398		A	0.2	A	25	0	0.1	55	2.0 m		4.5		92/
2N3399	G	P			AH	0.08	A			0.007	10	1.5 m	400 T	2.0		
2N3400	G	P			SH	0.15	A	20	0	0.1	50	10 m	150 T	3.0	60/260	9/
2N3401	S	P			SC	0.25	A	25	0	0.1			0.08 T	15		5/
2N3402	S	N	MPS6513	MPS6512	A	0.56	A	25	0	0.5	75	2.0 m				
2N3403	S	N	MPS6515	MPS6512	A	0.56	A	25	0	0.5	180	2.0 m				
2N3404	S	N			A	0.56	A	50	0	0.5	75	2.0 m				
2N3405	S	N			A	0.56	A	50	0	0.5	180	2.0 m				
2N3406				TABLE10	UJT											
2N3407	S	N			AH	0.2	A	18	0	0.1	10	10 m	300 T	2.5		
2N3408	S	P			AH	4.0	A	25	0	0.5	10	40 m	200 T	10		
2N3409	S	N		MD3409	AM	0.5	A	30	0	0.5	30	0.1 m	250 T	8.0		
2N3410	S	N		MD3409	AM	0.5	A	30	0	0.5	20	10 *	250 T	8.0		
2N3411	S	N			AM	0.5	A	30	0	0.5	20	10 *	250 T	8.0		
2N3412	G	P			A	0.06	A	20	S	0.1	30	10 m	100 T	3.0		5/
2N3413	S	P			A	0.4	A	150	0		10	50 m	0.25 T	60		5/
2N3414	S	N	MPS6513	MPS6512	A	0.36	A	25	0	0.5	75	2.0 m				
2N3415	S	N	MPS6515	MPS6512	A	0.36	A	25	0	0.5	180	2.0 m				
2N3416	S	N	MPS6515	MPS6512	A	0.36	A	50	0	0.5	75	2.0 m				
2N3417	S	N	MPS6515	MPS6512	A	0.36	A	50	0	0.5	180	2.0 m				
2N3418	S	N	2N5334	2N5334	SP	0.8	A	60	0	3.0	20	1.0 A	40 T	130	300/1200	5/
2N3419	S	N	2N5335	2N5334	SP	0.8	A	80	0	3.0	20	1.0 A	40 T	130	300/1200	5/
2N3420	S	N	2N5336	2N5336	SP	0.8	A	60	0	3.0	40	1.0 A	40 T	130	300/1200	5/
2N3421	S	N	2N5336	2N5336	SP	0.8	A	80	0	3.0	40	1.0 A	40 T	130	300/1200	5/
2N3422				TABLE7	THY											
2N3423	S	N			AM	0.3	A	15	0	0.05	20	3.0 m	600 T	1.7		
2N3424	S	N			AM	0.3	A	15	0	0.05	20	3.0 m	600 T	1.7		
★2N3425	S	N		2N3425	AHP	0.3	A	15	0		30	10 m	300 T	6.0	50/90	78/654
2N3426	S	N			SH	0.6	A	12	0	1.0	30	0.3 A	450 T	15	15/25	
★2N3427	G	P		2N3427	A	0.2	A	30	R	0.5	100	0.1 A	4.0 T	20		5/31
★2N3428	G	P		2N3427	A	0.2	A	30	R	0.5	150	0.1 A	5.0 T	20		5/31
2N3429	S	N	2N5877	2N5875	SP	150	C	50	0	5.0	10	5.0 A	0.2 E		5k/12k	
2N3430	S	N	2N5632	2N5632	SP	150	C	100	0	5.0	10	5.0 A	0.2 E		5k/12k	
2N3431	S	N	2N5634	2N5632	SP	150	C	150	0	5.0	10	5.0 A	0.2 E		5k/12k	
2N3432	S	N			SP	150	C	200	0	5.0	10	5.0 A	0.2 E		5k/12k	
2N3433	S	N			SP	150	C	250	0	5.0	10	5.0 A	0.2 E		5k/12k	
2N3434	S	N			SP	150	C	300	0	5.0	10	5.0 A			5k/12k	
2N3435	S	N			AHP	1.0	A	60	0	0.25	50	10 m	140 T	5.0		5/
2N3436				TABLE8	FET											
THRU																
2N3438				TABLE8	FET											
★2N3439	S	N		2N3439	AH	1.0	A	350	0	1.0	40	20 m	15 T	10		5/31
★2N3440	S	N		2N3439	AH	1.0	A	250	0	1.0	40	20 m	15 T	10		5/31
2N3441	S	N			AP	25	C	140	0	3.0	20	0.5 A	0.2 T			
2N3442	S	N			AP	100	C	140	0	10	20	3.0 A	80 T			3/
2N3443	G	P			AH	0.3	A	15	0	0.1	20	.10 m	750 T	2.5		5/
★2N3444	S	N		2N3252	SH	1.0	A	50	0		20	0.5 A	150 T	12	50/70	5/31
★2N3445	S	N		2N3445	AP	115	C	60	0	7.5	20	3.0 A	10 T	400	350/2350	3/11
★2N3446	S	N		2N3445	AP	115	C	80	0	7.5	20	3.0 A	10 T	400	350/2350	3/11
★2N3447	S	N		2N3445	AP	115	C	60	0	7.5	40	5.0 A	10 T	400	350/2350	3/11
★2N3448	S	N		2N3445	AP	115	C	80	0	7.5	40	5.0 A	10 T	400	350/2350	3/11
2N3449	G	P			SH	0.15	A	6	0	0.1	20	10 m	300 T	5.0	55/120	18/
2N3450	S	N			SH	0.6	A	60	0	0.8	40	.15 A	100 T	15	200/235	5/
2N3451	S	P			SH	0.3	A	6	0		30	10 m	500 T	3.5	60/60	18/
2N3452				TABLE8	FET											
THRU																
2N3460				TABLE8	FET											
2N3461	G	P			AP	5.0	C	30	0	3.0	90	0.5 A	0.9 E			
2N3462	S	N			A	0.3	A	35	0	0.03	100	10 *	10 T	6.0		18/
2N3463	S	N			A	0.3	A	45	0	0.03	120	10 *	45 T	6.0		18/
2N3464	S	N	2N5334	2N5334	AHP	5.0	C	40	0	5.0	35	0.2 A	30 T			5/
2N3465				TABLE8	FET											
2N3466				TABLE8	FET											
★2N3467	S	P		2N3467	SH	1.0	A	40	0	1.0	40	0.5 A	175 T	25	10/90	5/31
★2N3468	S	P		2N3467	SH	1.0	A	50	0	1.0	25	0.5 A	150 T	25	10/90	5/31
2N3469	S	N	2N5337	2N5336	AHP	1.25	A	25	0	5.0	100	0.5 A	20 T	150		5/
2N3470	S	N	2N6057	2N6050	AP	150	C	50	0	10	100	9.0 A	0.7 E			
2N3471	S	N	2N6059	2N6050	AP	150	C	100	0	10	100	9.0 A	0.7 E			

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N3472	S	N			AP	150	C	150	0	10	100	9.0 A	0.7 E			
2N3473	S	N			AP	150	C	200	0	10	100	9.0 A	0.7 E			
2N3474	S	N	2N6055	2N6053	AP	150	C	50	0	10	700	4.0 A	2.8 E			
2N3475	S	N			AP	150	C	100	0	10	700	4.0 A	2.8 E			
2N3476	S	N			AP	150	C	150	0	10	700	4.0 A	2.8 E			
2N3477	S	N			AP	150	C	200	0	10	700	4.0 A	2.8 E			
2N3478	S	N			AH	0.2	A	15	0		25	2.0 m	750 T	2.0		
2N3479				TABLE10	UJT											
THRU																
2N3484				TABLE10	UJT											
★2N3485	S	P		2N2904	SH	2.0	C	40	0	0.6	40	.15 A	200 T	8.0	45/100	46/26
★2N3485A	S	P		2N2904	SH	2.0	C	60	0	0.6	40	.15 A	200 T	8.0	45/100	46/26
★2N3486	S	P		2N2904	SH	2.0	C	40	0	0.6	100	.15 A	200 T	8.0	45/100	46/26
★2N3486A	S	P		2N2904	SH	2.0	C	60	0	0.6	100	.15 A	200 T	8.0	45/100	46/26
★2N3487	S	N		2N3487	AP	115	C	60	0	7.5	20	3.0 A	10 T	550	350/2350	61/9
★2N3488	S	N		2N3487	AP	115	C	80	0	7.5	20	3.0 A	10 T	550	350/2350	61/9
★2N3489	S	N		2N3487	AP	115	C	100	0	7.5	15	3.0 A	10 T	550	350/2350	61/9
★2N3490	S	N		2N3487	AP	115	C	60	0	7.5	40	5.0 A	10 T	550	350/2350	61/9
★2N3491	S	N		2N3487	AP	115	C	80	0	7.5	40	5.0 A	10 T	550	350/2350	61/9
★2N3492	S	N		2N3487	AP	115	C	100	0	7.5	30	5.0 A	10 T	550	350/2350	61/9
2N3493	S	N			SH	0.15	A	8	0	0.025	40	0.5 m	400 T	0.7		
★2N3494	S	P		2N3494	AH	0.6	A	80	0	0.1	35	0.1 A	200 T	7.0	300/1000	5/31
★2N3495	S	P		2N3494	AH	0.6	A	120	0	0.1	35	0.1 m	150 T	6.0	300/1000	5/31
★2N3496	S	P		2N3494	AH	0.4	A	80	0	0.1	35	0.1 A	200 T	7.0	300/1000	18/22
★2N3497	S	P		2N3494	AH	0.4	A	120	0	0.1	35	0.1 m	150 T	6.0	300/1000	18/22
★2N3498	S	N		2N3498	AH	1.0	A	100	0	0.5	40	.15 A	150 T	10		5/31
★2N3499	S	N		2N3498	AH	1.0	A	100	0	0.5	100	.15 A	150 T	10		5/31
★2N3500	S	N		2N3498	AH	1.0	A	150	0	0.3	40	.15 A	150 T	8.0		5/31
★2N3501	S	N		2N3498	AH	1.0	A	150	0	0.3	100	.15 A	150 T	8.0		5/31
2N3502	S	P	2N2905	2N2904	SH	0.7	A	45	0	0.6	115	50 m	200 T	8.0	40/100	5/
2N3503	S	P	2N2905A	2N2904	SH	0.7	A	60	0	0.6	115	50 m	200 T	8.0	40/100	5/
2N3504	S	P	2N2907	2N2904	SH	0.4	A	45	0	0.6	115	50 m	200 T	8.0	40/100	18/
2N3505	S	P	2N2907A	2N2904	SH	0.4	A	60	0	0.6	115	50 m	200 T	8.0	40/100	18/
★2N3506	S	N		2N3506	SH	1.0	A	40	0	3.0	40	1.5 A	60 T	40	45/90	5/31
★2N3507	S	N		2N3506	SH	1.0	A	50	0	3.0	30	1.5 A	60 T	40	45/90	5/31
★2N3508	S	N		2N3508	SH	0.4	A	20	0	0.5	40	10 m	500 T	4.0	12/18	46/26
★2N3509	S	N		2N3508	SH	0.4	A	20	0	0.5	100	10 m	500 T	4.0	12/18	46/26
★2N3510	S	N		2N3510	SH	0.36	A	10	0	0.5	25	.15 A	350 T	4.0	20/25	52/27
★2N3511	S	N		2N3510	SH	0.36	A	15	0	0.5	30	.15 A	450 T	4.0	16/18	52/27
2N3512	S	N			SH	0.8	A	35	0		10	0.5 A	250 T	10	30/45	5/
2N3513	S	N	2N2480A	2N2060	AM	0.25	A	40	0	0.5	50	1.0 m	50 T	18		
2N3514	S	N	2N2480A	2N2060	AM	0.25	A	40	0	0.5	50	1.0 m	50 T	18		
2N3515	S	N			AM	0.25	A	40	0	0.5	50	1.0 m	50 T	18		
2N3516	S	N			AM	0.25	A	60	0	0.5	50	1.0 m	60 T	15		
2N3517	S	N			AM	0.25	A	60	0	0.5	50	1.0 m	60 T	15		
2N3518	S	N			AM	0.25	A	60	0	0.5	50	1.0 m	60 T	15		
2N3519	S	N			AM	0.25	A	30	0	0.05	150	1.0 m	60 T	8.0		
2N3520	S	N			AM	0.25	A	30	0	0.05	150	1.0 m	60 T	8.0		
2N3521	S	N			AM	0.3	A	55	0	0.05	100	10 *	30 T	8.0		
2N3522	S	N			AM	0.25	A	55	0	0.05	100	10 *	30 T	8.0		
2N3523	S	N			AM	0.25	A	55	0	0.05	100	10 *	30 T	8.0		
2N3524	S	N			AM	0.25	A	55	0	0.05	100	10 *	30 T	8.0		
2N3525				TABLE7	THY											
2N3526	S	N			AH	0.8	A	120	0		30	30 m	40 T	12		5/
2N3527	S	P			A	0.4	A	30	0	0.1	25	0.1 n	5.0 T	10		46/
2N3528				TABLE7	THY											
THRU																
2N3541				TABLE7	THY											
2N3543	S	N			AHP	60	C	60	0	5.0	10	4.5 A	150 T	100		3/
★2N3544	S	N		2N3544	AH	0.3	A	25	S	0.1	25	10 m	600 T	2.5		18/22
2N3545	S	P			SH	0.36	A	20	0	0.2	40	10 m	250 T	8.0	60/90	18/
★2N3546	S	P		2N3546	SH	0.36	A	12	0	0.2	30	10 m	700 T	6.0	40/30	18/22
2N3547	S	P			A	0.36	A	60	0	0.1	100	1.0 m	45 T	8.0		18/
2N3548	S	P			A	0.4	A	45	0	0.1	100	10 *	60 T	8.0		18/
2N3549	S	P			A	0.4	A	60	0	0.1	100	10 *	60 T	8.0		18/
2N3550	S	P			A	0.4	A	45	0	0.1	200	10 *	60 T	8.0		18/
2N3551	S	N			SHP	40	C	60	0	12	20	10 A	40 T	850	300/2500	
2N3552	S	N			SHP	40	C	80	0	12	20	10 A	40 T	850	300/2500	
★2N3553	S	N		2N3375	AHP	7.0	C	40	0	1.0	10	.25 A	400 T	10		39/79
2N3554	S	N			SH	0.8	A	30	0	1.2	25	.75 A	150 T	25	50/105	5/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No.	Case No.
2N3555				TABLE7	THY												
THRU																	
2N3562				TABLE7	THY												
2N3563	S	N			AH	0.2	A	12	0	0.05	20	8.0 m	600 T	1.7		92	
2N3564	S	N			AH	0.2	A	15	0	0.1	20	15 m	400 T	3.5			
2N3565	S	N	MPS6514	MPS6512	A	0.2	A	25	0	0.05	150	1.0 m	40 T	4.0			
2N3566	S	N	MPS6514	MPS6512	A	0.3	A	30	0	0.2	150	10 m	40 T	25			
2N3567	S	N	MPS6530	MPS6530	A	0.3	A	40	0	0.5	40	.15 A	60 T	20		105	
2N3568	S	N			A	0.3	A	60	0	0.5	40	.15 A	60 T	20		105	
2N3569	S	N	MPS6531	MPS6530	A	0.3	A	40	0	0.5	100	.15 A	60 T	20		105	
2N3570	S	N			AH	0.2	A	15	0	0.05	20	5.0 m	1500 T				
2N3571	S	N			AH	0.2	A	15	0	0.05	20	5.0 m	1500 T				
2N3572	S	N			AH	0.2	A	13	0	0.05	20	5.0 m	1000 T				
2N3573				TABLE8	FET												
THRU																	
2N3575				TABLE8	FET												
2N3576	S	P	2N3251	2N3250	SH	0.36	A	15	0		40	10 m	400 T	4.5	30/50	18	
2N3577	S	N			AHP	85	C	80	0	2.0	12	1.0 A	10 T			53	
2N3578				TABLE8	FET												
2N3579	S	P	2N3799	2N3798	AH	0.4	A	60	0	0.03	30	1.0 m	80 T	6.0		46	
2N3580	S	P	2N3799	2N3798	AH	0.4	A	60	0	0.03	60	1.0 m	80 T	6.0		46	
2N3581	S	P	2N3799	2N3798	AH	0.4	A	40	0	0.03	50	0.1 m	30 T	6.0		46	
2N3582	S	P	2N3799	2N3798	AH	0.4	A	40	0	0.03	100	0.1 m	30 T	6.0		46	
★2N3583	S	N		2N3583	AHP	35	C	175	0	1.0	40	0.5 A	10 T	120		66	80
★2N3584	S	N		2N3584	SP	35	C	250	0	2.0	8.0	1.0 A	10 T	120	3000/7000	66	80
★2N3585	S	N		2N3585	SP	35	C	300	0	2.0	8.0	1.0 A	10 T	120	3000/7000	66	80
2N3586	S	P			SC	0.125	A	45	0	0.1			0.1 T	18			
2N3587	S	N			AM	0.3	A	45	0	0.5	80	1.0 m	80 T	8.0			
2N3588	G	P			AM	0.1	A	25	B	0.01	20	1.0 m	200 T				
2N3589	S	N	2N3738	2N3738	AHP	2.0	A	200	R	0.5	30	0.2 A	15 T				
2N3590	S	N	2N6233	2N6233	AHP	2.0	A	200	R	0.5	75	0.2 A	15 T				
2N3591	S	N			AHP	1.0	A	200	R	0.5	30	0.2 A	15 T				
2N3592	S	N			AHP	1.0	A	200	R	0.5	75	0.2 A	15 T				
2N3593	S	N			AHP	1.0	A	200	R	0.5	30	0.2 A	15 T				
2N3594	S	N			AHP	1.0	A	200	R	0.5	75	0.2 A	15 T				
2N3595	S	N			AHP	1.5	A	200	R	0.5	30	0.2 A	15 T				
2N3596	S	N			AHP	1.5	A	200	R	0.5	75	0.2 A	15 T				
2N3597	S	N	MJ7000	MJ7000	SHP	100	C	40	0	20	40	10 A	30 T	700	700/2700	63	
2N3598	S	N	MJ7000	MJ7000	SHP	100	C	60	0	20	40	10 A	30 T	700	700/2700	63	
2N3599	S	N	MJ7000	MJ7000	SHP	100	C	80	0	20	40	10 A	30 T	700	700/2700	63	
2N3600	S	N			AH	0.2	A	15	0		20	3.0 m	850 T			72	
2N3601	G	P			SP	0.286	C	40	0	3.5	60	1.0 A	20 T		1300/2700		
2N3602	G	P			SP	0.286	C	40	0	3.5	60	1.0 A	20 T		1300/2700		
2N3603	G	P			SP	0.286	C	55	0	3.5	60	1.0 A	20 T		1300/2700		
2N3604	G	P			SP	0.286	C	55	0	3.5	60	1.0 A	20 T		1300/2700		
2N3605	S	N	MPS3646	MPS3646	S	0.2	A	14	0	0.2	30	10 m	300 T	6.0	35/45		
2N3605A	S	N			S	0.32	A	15	0	0.2	30	10 m	300 T	6.0	35/45	98	
2N3606	S	N	MPS3646	MPS3646	S	0.2	A	14	0	0.2	30	10 m	300 T	6.0	40/60		
2N3606A	S	N			S	0.32	A	15	0	0.2	30	10 m	300 T	6.0	40/60	98	
2N3607	S	N	MPS3646	MPS3646	S	0.2	A	14	0	0.2	30	10 m	300 T	6.0	45/70		
2N3608				TABLE8	FET												
THRU																	
2N3610				TABLE8	FET												
★2N3611	G	P		2N3611	AP	85	C	30	S	7.0	35	3.0 A	0.3 T			3	11
★2N3612	G	P		2N3611	AP	85	C	45	S	7.0	35	3.0 A	0.3 T			3	11
★2N3613	G	P		2N3611	AP	85	C	30	S	7.0	60	3.0 A	0.3 T			3	11
★2N3614	G	P		2N3611	AP	85	C	45	S	7.0	60	3.0 A	0.3 T			3	11
★2N3615	G	P		2N3615	AP	85	C	60	S	7.0	30	3.0 A	0.3 T			3	11
★2N3616	G	P		2N3615	AP	85	C	75	S	7.0	30	3.0 A	0.3 T			3	11
★2N3617	G	P		2N3615	AP	85	C	60	S	7.0	45	3.0 A	0.3 T			3	11
★2N3618	G	P		2N3615	AP	85	C	75	S	7.0	45	3.0 A	0.3 T			3	11
2N3619	S	N			AHP	7.5	C	40	0	2.5	40	1.0 A	200 T	50			
2N3620	S	N			AHP	7.5	C	40	0	5.0	40	1.0 A	200 T	50			
2N3621	S	N			AHP	30	C	40	0	5.0	40	1.0 A	200 T	50			
2N3622	S	N			AHP	30	C	40	0	5.0	40	1.0 A	200 T	50		61	
2N3623	S	N			AHP	7.5	C	40	0	2.5	40	1.0 A	200 T	50		61	
2N3624	S	N			AHP	7.5	C	40	0	5.0	40	1.0 A	200 T	50			
2N3625	S	N			AHP	30	C	40	0	5.0	40	1.0 A	200 T	50			
2N3626	S	N			AHP	30	C	40	0	5.0	40	1.0 A	200 T	50		61	
2N3627	S	N			AHP	7.5	C	50	0	2.5	40	1.0 A	200 T	50		61	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No. / Case No.
2N3628	S	N			AHP	7.5	C	50	0	5.0	40	1.0 A	200 T	50		
2N3629	S	N			AHP	30	C	50	0	5.0	40	1.0 A	200 T	50		
2N3630	S	N			AHP	30	C	50	0	5.0	40	1.0 A	200 T	50		61/
2N3631				TABLE8	FET											61/
★2N3632	S	N		2N3375	AHP	23	C	40	0	3.0	10	.25 A	250 T	25		
2N3633	S	N			SH	0.3	A	6	0	0.05	50	10 m	1300 T	2.5	9.0/9.0	60/36
★2N3634	S	P		2N3634	AH	1.0	A	140	0	1.0	50	50 m	150 T	10	400/600	18/
★2N3635	S	P		2N3634	AH	1.0	A	140	0	1.0	100	50 m	200 T	10	400/600	5/31
★2N3636	S	P		2N3634	AH	1.0	A	175	0	1.0	50	50 m	150 T	10	400/600	5/31
★2N3637	S	P		2N3634	AH	1.0	A	175	0	1.0	100	50 m	200 T	10	400/600	5/31
2N3638	S	P			SH	0.3	A	25	0	0.5	30	50 m	100 T	20	75/170	92/
2N3638A	S	P			SH	0.3	A	25	0	0.5	100	50 m	150 T	10	75/170	92/
2N3639	S	P	MPS3639	MPS3639	SH	0.2	A	6	0	0.08	30	10 m	500 T	3.5	25/60	92/
2N3640	S	P	MPS3640	MPS3640	SH	0.2	A	12	0	0.08	30	10 m	500 T	3.5	25/60	92/
2N3641	S	N	MPS6530	MPS6530	AHP	0.35	A	30	0	0.5	40	.15 A	150 T	8.0		
2N3642	S	N	MPS6530	MPS6530	AHP	0.35	A	45	0	0.5	40	.15 A	150 T	8.0		
2N3643	S	N	MPS6531	MPS6530	AHP	0.35	A	30	0	0.5	100	.15 A	250 T	8.0		
2N3644	S	P			SH	0.3	A	45	0	0.5	80	50 m	200 T	8.0	40/100	
2N3645	S	P			SH	0.3	A	60	0	0.5	80	50 m	200 T	8.0	40/100	
2N3646	S	N	MPS3646	MPS3646	SH	0.2	A	15	0	0.2	30	30 m	350 T	5.0	18/28	92/
★2N3647	S	N		2N3510	SH	0.4	A	10	0	0.5	25	.15 A	350 T	4.0	20/25	46/26
★2N3548	S	N		2N3510	SH	0.4	A	15	0	0.5	30	.15 A	450 T	4.0	16/18	46/26
2N3649				TABLE7	THY											
THRU																
2N3658				TABLE7	THY											
2N3659	S	N			AH	4.0	C	170	0	0.5	20	10 m	50 T	6.0		5/
2N3660	S	P	2N3719	2N3719	AHP	5.0	C	30	0	1.5	25	0.5 A	25 T	275		5/
2N3661	S	P	2N3720	2N3719	AHP	5.0	C	50	0	1.5	25	0.5 A	25 T	275		5/
2N3662	S	N			AH	0.2	A	12	0	0.025	20	8.0 m	700 T	1.7		
2N3663	S	N			AH	0.2	A	12	0	0.025	20	8.0 m	700 T	1.7		
2N3664	S	N			AHP	5.0	C	60	S	0.5	8.0	50 m	300 T	60		
2N3665	S	N	2N5335	2N5334	S	5.0	C	80	0	1.0	40	.15 A	60 T	12		5/
2N3666	S	N			S	5.0	C	80	0	1.0	100	.15 A	60 T	12		5/
2N3667	S	N	2N5881	2N5879	SP	117	C	50	0	15	15	8.0 A	0.5 T		6.0/12	
2N3668				TABLE7	THY											
THRU																
2N3670				TABLE7	THY											
2N3671	S	P			S	0.6	A	50	0	0.6	75	.15 A	200 T	9.0	45/100	5/
2N3672	S	P			S	0.4	A	50	0	0.6	75	.15 A	200 T	9.0	45/100	18/
2N3673	S	P			S	0.35	A	50	0	0.6	75	.15 A	200 T	9.0	45/100	46/
2N3675	S	N	2N4238	2N4237		8.8	C	55	0	3.0	12	1.0 A	1.0 T		5k/10k	5/
2N3676	S	N	2N4239	2N4237	SP	8.8	C	90	0	3.0	12	1.0 A	1.0 T		5k/10k	5/
2N3677	S	P			SP	0.4	A	20	0	0.1			5.0 T	10		46/
2N3678	S	N	2N3019	2N3019	SC	0.8	A	55	0	0.8	40	.15 A	250 T	8.0		
2N3679				TABLE10	UJT								T			
2N3680	S	N			AM	0.3	A	50	0	0.03	150	10 *	60 T	6.0		
2N3681	S	N			AH	0.2	A	7	0		20	2.0 m	1000 T			
2N3682	S	N			AH	0.36	A	15	0	0.2	40	10 m	600 T	4.0		18/
2N3683	S	N			AH	0.2	A	12	0	0.03	20	8.0 m	1000 T			72/
2N3684,A				TABLE8	FET											
THRU																
2N3687,A				TABLE8	FET											
2N3688	S	N			AH	0.2	A	40	0	0.03	30	4.0 m	400 T	1.6		
2N3689	S	N			AH	0.2	A	40	0	0.03	30	4.0 m	400 T	1.6		
2N3690	S	N			AH	0.2	A	40	0	0.03	30	4.0 m	400 T	1.6		
2N3691	S	N	MPS6512	MPS6512	A	0.2	A	20	0	0.03	40	10 m	200 T	3.5		
2N3692	S	N	MPS6513	MPS6512	A	0.2	A	20	0	0.03	100	10 m	200 T	3.5		
2N3693	S	N			AH	0.2	A	45	0	0.03	40	10 m	200 T	6.0		92/
2N3694	S	N			AH	0.2	A	45	0	0.03	100	10 m	200 T	6.0		92/
2N3695				TABLE8	FET											
THRU																
2N3698				TABLE8	FET											
2N3700	S	N	2N3019	2N3019	AH	0.5	A	80	0	1.0	100	.15 A	100 T	12		18/
2N3701	S	N	2N3019	2N3019	AH	0.5	A	80	0	1.0	40	.15 A	80 T	12		18/
2N3702	S	P	2N3250	2N3250	A	0.3	A	25	0	0.2	60	50 m	100 T	12		92/
2N3703	S	P	2N3251	2N3250	A	0.3	A	30	0	0.2	30	50 m	100 T	12		92/
2N3704	S	N	2N2222A	2N2218	A	0.36	A	30	0	0.8	100	50 m	100 T	12		92/
2N3705	S	N	2N2222A	2N2218	A	0.36	A	30	0	0.8	50	50 m	100 T	12		92/
2N3706	S	N	2N930	2N929	A	0.36	A	20	0	0.8	30	50 m	100 T	12		92/
2N3707	S	N			A	0.25	A	30	0	0.03	100	0.1 m				92/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N3708	S	N			A	0.25	A	30	0	0.03	45	1.0 m				92/
2N3709	S	N			A	0.25	A	30	0	0.03	45	1.0 m				92/
2N3710	S	N			A	0.25	A	30	0	0.03	90	1.0 m				92/
2N3711	S	N			A	0.25	A	30	0	0.03	180	1.0 m				92/
★2N3712	S	N		2N3712	AH	0.8	A	150	0	0.2	30	30 m	40 T	9.0		5/31
★2N3713	S	N		2N3713	AHP	150	C	60	0	10	25	1.0 A	0.75 E	250		3/11
★2N3714	S	N		2N3713	AHP	150	C	80	0	10	25	1.0 A	0.75 E	250		3/11
★2N3715	S	N		2N3713	AHP	150	C	60	0	10	50	1.0 A	1.5 E	250		3/11
★2N3716	S	N		2N3713	AHP	150	C	80	0	10	50	1.0 A	1.5 E	250		3/11
2N3717	S	N			AHP	7.5	C	60	S	1.0	2.0	0.5 A	250 T	10		39/
2N3718	S	N			AHP	10	C	60	S	1.0	2.0	0.5 A	250 T	10		
★2N3719	S	P		2N3719	SHP	6.0	C	40	0	3.0	25	1.0 A	60 T	120	100/400	5/31
★2N3720	S	P		2N3719	SHP	6.0	C	60	0	3.0	25	1.0 A	60 T	120	100/400	5/31
2N3721	S	N	MP3731		A	0.2	A	18	0	0.1				12		
2N3722	S	N			S	0.8	A	60	0	0.5	40	0.1 A	300 T	10	50/100	5/
2N3723	S	N			SH	0.8	A	80	0	0.5	40	0.1 A	300 T	9.0	70/130	5/
★2N3724	S	N	MM3724	MM3724	SH	0.8	A	30	0	0.5	60	0.1 A	300 T	12	35/60	39/79
2N3724A	S	N			SH	1.0	A	30	0	1.2	60	100 m	300 T		35/60	5/
★2N3725	S	N	MM3725	MM3724	SH	0.8	A	50	0	0.5	60	0.1 A	300 T	10	35/60	39/79
2N3725A	S	N			SH	1.0	A	50	0	1.2	60	100 m	300 T		35/60	5/
★2N3726	S	P		2N3726	AM	0.4	A	45	0	0.6	135	1.0 m	200 T	8.0		/654
★2N3727	S	P		2N3726	AM	0.4	A	45	0	0.6	135	1.0 m	200 T	8.0		/654
2N3728	S	N			AM	0.45	A	30	0	0.5	80	.15 A	250 T	8.0		
2N3729	S	N			AM	0.45	A	30	0	0.5	80	.15 A	250 T	8.0		
2N3730	G	P			AP	10	A	200	S	3.0	10	50 m	1.0 T			3/
2N3731	G	P			AP	5.0	A	320	S	10	15	6.0 A				3/
2N3732	G	P			AP	3.0	A	100	S	3.0	35	0.7 A	1.0 T			3/
2N3733	S	N			AHP	23	C	40	0	1.0	10	.25 A	250 T	25		60/
★2N3734	S	N		2N3734	SH	1.0	A	30	0	1.5	30	1.0 A	300 T	9.0	48/60	39/79
2N3734A	S	N	2N5334	2N5334	SH	1.0	A	30	0	1.5	30	1.0 A		9.0		5/
★2N3735	S	N		2N3734	SH	1.0	A	50	0	1.5	20	1.0 A	250 T	9.0	48/60	39/79
2N3735A	S	N			SH	1.0	A	50	0	1.5	20	1.0 A		8.0		5/
★2N3736	S	N		2N3734	SH	0.5	A	30	0	1.5	30	1.0 A	300 T	9.0	48/60	46/26
2N3736A	S	N			SH	0.5	A	30	0	1.5	30	1.0 A		9.0		46/
★2N3737	S	N		2N3734	SH	0.5	A	50	0	1.5	20	1.0 A	250 T	9.0	48/60	46/26
2N3737A	S	N			SH	0.5	A	50	0	1.5	20	1.0 A		8.0		46/
★2N3738	S	N		2N3738	AP	20	C	225	0	0.25	40	0.1 A	15 T	20		66/80
★2N3739	S	N		2N3738	AP	20	C	300	0	0.25	40	0.1 A	15 T	20		66/80
★2N3740	S	P		2N3740	AP	25	C	60	0	4.0	30	.25 A	4.0 T	100	/-100	
★2N3740,A	S	P		2N3740	AP	25	C	60	0	4.0	30	.25 A	4.0 T	4.0	/-100	66/80
★2N3741	S	P		2N3740	AP	25	C	80	0	4.0	30	.25 A	4.0 T	100	/-100	
★2N3741,A	S	P		2N3740	AP	25	C	80	0	4.0	30	.25 A	4.0 T	4.0	/-100	66/80
★2N3742	S	N		2N3742	AH	1.0	A	300	0	0.05	20	30 m	30 T	6.0		5/
★2N3743	S	P		2N3743	AH	1.0	A	300	0	0.05	25	30 m	30 T	15		39/79
2N3744	S	N	2N5346	2N5346	AHP	30	C	40	0	5.0	20	1.0 A	30 T	150	120/140	
2N3745	S	N	2N5346	2N5346	AHP	30	C	60	0	5.0	20	1.0 A	30 T	150	120/140	
2N3746	S	N	2N5346	2N5346	AHP	30	C	80	0	5.0	20	1.0 A	30 T	150	120/140	
2N3747	S	N	2N5347	2N5346	AHP	30	C	40	0	5.0	40	1.0 A	40 T	150	80/140	
2N3748	S	N	2N5347	2N5346	AHP	30	C	60	0	5.0	40	1.0 A	40 T	150	80/140	
2N3749	S	N	2N5348	2N5346	AHP	30	C	80	0	5.0	40	1.0 A	40 T	150	80/140	
2N3750	S	N	2N5348	2N5346	AHP	30	C	40	0	5.0	100	1.0 A	50 T	150	80/140	
2N3751	S	N	2N5348	2N5346	AHP	30	C	60	0	5.0	100	1.0 A	50 T	150	80/140	
2N3752	S	N	2N5348	2N5346	AHP	30	C	80	0	5.0	100	1.0 A	50 T	150	80/140	
2N3753 THRU				TABLE7	THY											
2N3761				TABLE7	THY											
★2N3762	S	P		2N3762	SH	1.0	A	40	0	1.5	30	1.0 A	180 T	15	43/115	5/31
★2N3763	S	P		2N3762	SH	1.0	A	60	0	1.5	20	1.0 A	150 T	15	43/115	5/31
★2N3764	S	P		2N3762	SH	0.5	A	40	0	1.5	30	1.0 A	180 T	15	43/115	46/26
★2N3765	S	P		2N3762	SH	0.5	A	60	0	1.5	20	1.0 A	150 T	15	43/115	46/26
★2N3766	S	N		2N3766	AP	20	C	60	0	4.0	40	0.5 A	15 T	50		66/80
★2N3767	S	N		2N3766	AP	20	C	80	0	4.0	40	0.5 A	15 T	50		66/80
2N3770	G	P			AH	0.05	A	6	0	0.05	10	1.0 m	100 T	3.0		
★2N3771	S	N		2N3771	AP	150	C	40	0	15	15	15 A	0.2 T			3/
★2N3772	S	N		2N3771	AP	150	C	60	0	10	15	10 A	0.2 T			3/
★2N3773	S	N			AP	150	C	140	0	8.0	15	8.0 A	0.2 T			3/
2N3774	S	P	2N4234	2N4234	SP	5.0	C	40	0	1.0	20	0.2 A	1.0 T		3000/3000	5/
2N3775	S	P	2N4235	2N4234	SP	5.0	C	60	0	1.0	20	0.2 A	1.0 T		3000/3000	5/
2N3776	S	P	2N4236	2N4234	SP	5.0	C	80	0	1.0	20	0.2 A	1.0 T		3000/3000	5/
2N3777	S	P	2N5679	2N5679	SP	5.0	C	100	0	1.0	20	0.2 A	1.0 T		3000/3000	5/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N3778	S	P	2N4234	2N4234	SP	5.0	C	40	0	1.0	10	0.2 A	1.0 T		3000/3000	5/
2N3779	S	P	2N4235	2N4234	SP	5.0	C	60	0	1.0	10	0.2 A	1.0 T		3000/3000	5/
2N3780	S	P	2N4236	2N4234	SP	5.0	C	80	0	1.0	10	0.2 A	1.0 T		3000/3000	5/
2N3781	S	P	2N5679	2N5679	SP	5.0	C	100	0	1.0	10	0.2 A	1.0 T		3000/3000	5/
2N3782	S	P	2N4234	2N4234	SP	5.0	C	40	0	1.0	10	1.0 A	1.0 T		3000/3000	5/
★2N3783	G	P		2N3783	AH	0.15	A	20	0	0.02	20	3.0 m	800 T	1.0		72/
★2N3784	G	P		2N3783	AH	0.15	A	20	0	0.02	20	3.0 m	700 T	1.0		72/
★2N3785	G	P		2N3783	AH	0.15	A	12	0	0.02	15	3.0 m	700 T	1.2		72/
2N3788	S	N			AP	100	C	325	0	1.0	20	.50 A	5.0 T	400		
★2N3789	S	P		2N3789	AP	150	C	60	0	10	25	1.0 A	0.75 E			3/11
★2N3790	S	P		2N3789	AP	150	C	80	0	10	25	1.0 A	0.75 E			3/11
★2N3791	S	P		2N3789	AP	150	C	60	0	10	50	1.0 A	1.5 E			3/11
★2N3792	S	P		2N3789	AP	150	C	80	0	10	50	1.0 A	1.5 E			3/11
2N3793	S	N	MPS6530	MPS6530	A	0.25	A	20	0	0.5	20	10 m	100 T	10		
2N3794	S	N	MPS6531	MPS6530	A	0.25	A	20	0	0.5	100	10 m	100 T	10		
2N3795	S	P			SP	5.0	C	120	0	1.0	12	10 m	0.5 T		5000/5000	5/
2N3796				TABLE8	FET											
2N3797				TABLE8	FET											
★2N3798	S	P		2N3798	A	0.36	A	60	0	0.05	150	0.5 m	30 T	4.0		
★2N3799	S	P		2N3798	A	0.36	A	60	0	0.05	300	0.5 m	30 T	4.0		18/22
2N3800	S	P			A	0.25	A	60	0	0.05	150	0.1 m	100 T	4.0		18/22
2N3801	S	P			A	0.25	A	60	0	0.05	300	0.1 m	100 T	4.0		71/
2N3802	S	P			AM	0.25	A	60	0	0.05	150	0.1 m	100 T	4.0		71/
2N3803	S	P			AM	0.25	A	60	0	0.05	300	0.1 m	100 T	4.0		71/
2N3804	S	P			AM	0.25	A	60	0	0.05	150	0.1 m	100 T	4.0		71/
2N3804A	S	P			AM	0.25	C	60	0	0.05	150	100 *	30 T	4.0		71/
2N3805	S	P			AM	0.25	A	60	0	0.05	300	0.1 m	100 T	4.0		71/
2N3805A	S	P			AM	0.25	C	60	0	0.05	300	100 *	30 T	4.0		71/
★2N3806	S	P		2N3806	A	0.5	A	60	0	0.05	150	0.1 m	100 T	4.0		/654
★2N3807	S	P		2N3806	A	0.5	A	60	0	0.05	300	0.1 m	100 T	4.0		/654
★2N3808	S	P		2N3806	AM	0.5	A	60	0	0.05	150	0.1 m	100 T	4.0		/654
★2N3809	S	P		2N3806	AM	0.5	A	60	0	0.05	300	0.1 m	100 T	4.0		/654
★2N3810	S	P		2N3806	AM	0.5	A	60	0	0.05	150	0.1 m	100 T	4.0		/654
★2N3810A	S	P		2N3806	AM	0.50	A	60	0	0.05	150	100 *	30 T	4.0		/654
★2N3811	S	P		2N3806	AM	0.5	A	60	0	0.05	300	0.1 m	100 T	4.0		/654
★2N3811A	S	P		2N3806	AM	0.50	A	60	0	0.05	300	100 *	30 T	4.0		/654
★2N3812	S	P		2N3806	AM	0.35	A	60	0	0.05	150	0.1 m	100 T	4.0		/610
★2N3813	S	P		2N3806	AM	0.35	A	60	0	0.05	300	0.1 m	100 T	4.0		/610
★2N3814	S	P		2N3806	AM	0.35	A	60	0	0.05	150	0.1 m	100 T	4.0		/610
★2N3815	S	P		2N3806	AM	0.35	A	60	0	0.05	300	0.1 m	100 T	4.0		/610
★2N3816	S	P		2N3806	AM	0.35	A	60	0	0.05	150	0.1 m	100 T	4.0		/610
★2N3816A	S	P		2N3806	AM	0.25	C	60	0	0.05	150	100 *	30 T	4.0		/610
★2N3817	S	P		2N3806	AM	0.35	A	60	0	0.05	300	0.1 m	100 T	4.0		/610
★2N3817A	S	P		2N3806	AM	0.25	C	60	0	0.05	300	100 *	30 T	4.0		/610
★2N3818	S	N		2N3818	AHP	25	C	60	S	2.0	5.0	400 m	150 T	40		60/36
2N3819				TABLE8	FET											
THRU																
2N3824				TABLE8	FET											
2N3825	S	N			AH	0.25	A	15	0	0.1	20	2.0 m	200 T	3.5		
2N3826	S	N			AH	0.2	A	45	0	0.03	40	10 m	200 T	3.5		
2N3827	S	N			AH	0.2	A	45	0	0.03	100	10 m	200 T	3.5		
2N3828	S	N	MPS6565	MPS6565	AH	0.3	A	40	0	0.1	30	12 m	360 T	5.0		
2N3829	S	P	2N3250	2N3250	SH	0.36	A	20	0	0.2	30	30 m	350 T	6.0	25/65	52/
2N3830	S	N	2N2193	2N2192	SH	1.0	A	50	0	1.2	30	.15 A	200 T	12	60/70	5/
2N3831	S	N	2N2193	2N2192	SH	1.0	A	40	0	1.2	35	.15 A	200 T	12	60/70	5/
2N3832	S	N			SH	0.2	A	6	0	0.035	25	2.0 m	800 T	0.85	35/30	
2N3833	S	N			AHP	1.0	C	15	0	0.1	20	30 m				
2N3834	S	N			AHP	1.0	C	15	0	0.1	20	30 m				
2N3835	S	N			AHP	1.0	C	15	0	0.1	20	30 m				
2N3836	S	N			SHP	1.0	A	60	0	7.0	2k	2.0 A	40 T	60	500/1000	
2N3837	S	N			SHP	1.0	A	80	0	7.0	2k	2.0 A	40 T	60	500/1000	
★2N3838	S	N		2N3838	SH	0.25	A	40	0	0.6	100	.15 A	200 T	8.0	50/340	/610
★2N3839	S	N			AH	0.2	A	15	0	0.04	30	3.0 m	2000 T	1.0		72/20
2N3840	S	P			SC	0.4	A	50	0	0.1	30	0.2 m	6.0 T	9.0		46/
2N3841	S	P			SC	0.3	A	100	0	0.1	15	0.2 m	1.5 T	9.0		18/
2N3842	S	P			SC	0.3	A	120	0	0.1	10	1.0 m	1.0 T	9.0		18/
2N3843	S	N	MPS6512	MPS6512	AH	0.2	A	30	0	0.1	20	2.0 m	60 T	4.0		
2N3843A	S	N	MPS6512	MPS6512	AH	0.2	A	30	0	0.1	20	2.0 m	60 T	4.0		
2N3844	S	N	MPS6512	MPS6512	AH	0.2	A	30	0	0.1	35	2.0 m	90 T	4.0		
2N3844A	S	N	MPS6512	MPS6512	AH	0.2	A	30	0	0.1	35	2.0 m	90 T	4.0		

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N3845	S	N	MPS6512	MPS6512	AH	0.2	A	40	0	0.1	60	2.0 m	126 T	4.0		
2N3845A	S	N	MPS6513	MPS6512	AH	0.2	A	30	0	0.1	60	2.0 m	126 T	4.0		
2N3846	S	N			AP	4.0	A	200	0	20	10	10 A	10 T	750		63/
2N3847	S	N			AP	4.0	A	300	0	20	10	10 A	10 T	750		63/
2N3848	S	N			AP	4.0	A	300	0	20	10	15 A	10 T	750		63/
2N3849	S	N			AP	4.0	A	300	0	20	10	15 A	10 T	750		63/
2N3850	S	N			SHP	30	C	80	0	5.0	50	1.0 A	20 T	125	200/900	59/
2N3851	S	N			SHP	30	C	80	0	5.0	30	1.0 A	20 T	125	200/900	59/
2N3852	S	N			SHP	30	C	40	0	5.0	50	1.0 A	20 T	125	200/900	59/
2N3853	S	N			SHP	30	C	40	0	5.0	30	1.0 A	20 T	125	200/900	59/
2N3854	S	N	MPS6512	MPS6512	AH	0.2	A	18	0	0.1	35	2.0 m	100 T	3.5		
2N3854A	S	N	MPS6512	MPS6512	AH	0.2	A	30	0	0.1	35	2.0 m	100 T	3.5		
2N3855	S	N	MPS6512	MPS6512	AH	0.2	A	18	0	0.1	60	2.0 m	130 T	3.5		
2N3855A	S	N	MPS6512	MPS6512	AH	0.2	A	30	0	0.1	60	2.0 m	130 T	3.5		
2N3856	S	N	MPS6513	MPS6512	AH	0.2	A	18	0	0.1	100	2.0 m	140 T	3.5		
2N3856A	S	N	MPS6513	MPS6512	AH	0.2	A	30	0	0.1	100	2.0 m	140 T	3.5		
2N3857	S	P			A	0.6	A	45	0	0.5	50	1.0 m	4.0 T	10		5/
2N3858	S	N	MPS6512	MPS6512	AH	0.2	A	30	0	0.1	60	2.0 m	90 T	4.0		
2N3858A	S	N	MPS6566	MPS6565	AH	0.2	A	60	0	0.1	45	1.0 m	90 T	4.0		98/
2N3859	S	N	MPS6513	MPS6512	AH	0.2	A	30	0	0.1	100	2.0 m	90 T	4.0		
2N3859A	S	N	MPS6566	MPS6565	A	0.2	A	60	0	0.1	75	1.0 m	90 T	4.0		98/
2N3860	S	N	MPS6514	MPS6512	AH	0.2	A	30	0	0.1	150	2.0 m	90 T	4.0		
2N3861	S	N			AP	2.0	A	530	V	0.025	30	25 m	50 T	55		
2N3862	S	N			S	0.36	A	20	0	0.2	50	10 m	600 T			18/
2N3863	S	N	2N3716	2N3713	SP	117	C	50	0	7.5	30	3.0 A	0.5 T		8.0/16	3/
2N3864	S	N	2N5758	2N5758	SP	117	C	90	0	7.5	30	3.0 A	0.5 T		8.0/16	3/
2N3865	S	N			SP	117	C	150	0	7.5	30	3.0 A	0.5 T		8.0/16	3/
★2N3866	S	N		2N3866	AHP	5.0	C	30	0	0.4	10	50 m	.50 T	3.0		39/79
★2N3866A	S	N		2N3866	A	5.0	C	30	0	0.4	25	.05 A	800 T	3.0		39/79
2N3867	S	P			SH	1.0	A	40	0	3.0	40	1.5 A	60 T	120	85/250	5/
2N3868	S	P			SH	1.0	A	60	0	3.0	30	1.5 A	60 T	120	85/250	5/
2N3869	S	N			AHP	2.5	C	20	0	0.5	20	30 m	400 T	10		5/
2N3870				TABLE7	THY											
THRU																
2N3873				TABLE7	THY											
2N3876	S	N			AP	150	C	50	0	10	25	10 A	50 T	1000		81/
2N3877	S	N	2N4410	2N4409	A	0.2	A	70	0	0.05	20	2.0 m				
2N3877A	S	N	2N4410	2N4409	A	0.2	A	85	0	0.05	20	2.0 m				
2N3878	S	N	2N5428	2N5427	AHP	35	C	50	0	4.0	40	0.5 A	40 T	175		66/
2N3879	S	N	2N5427	2N5427	SP	35	C	75	0	7.0	12	4.0 A	40 T	175	500/1250	66/
2N3880	S	N			AH	0.2	A	15	0		30	3.0 m	1200 T	0.75		72/
2N3881	S	N			AH	0.6	A	35	0	1.0			70 T	25		T5/
2N3882				TABLE8	FET											
★2N3883	G	P		2N3883	SH	0.3	A	15	0	0.3	30	0.2 A	100 T	8.0	55/110	5/31
2N3884				TABLE7	THY											
THRU																
2N3899				TABLE7	THY											
2N3900	S	N	2N5088	2N5088	A	0.2	A	18	0	0.1	250	2.0 m		12		
2N3900A	S	N	2N5088	2N5088	A	0.2	A	18	0	0.1	250	2.0 m		12		
2N3901	S	N	2N5088	2N5088	A	0.2	A	18	0	0.1	350	2.0 m				
★2N3902	S	N		2N3902	SP	100	C	400	0	2.5	20	1.0 A	0.8 E			3/11
★2N3903	S	N		2N3903	SH	0.31	A	40	0	0.2	50	10 m	250 T	4.0		92/29
★2N3904	S	N		2N3903	SH	0.31	A	40	0	0.2	100	10 m	300 T	4.0		92/29
★2N3905	S	P		2N3905	SH	0.31	A	40	0	0.2	50	10 m	200 T	4.5		92/29
★2N3906	S	P		2N3905	SH	0.31	A	40	0	0.2	100	10 m	250 T	4.5		92/29
2N3907	S	N			AM	0.3	A	45	0	0.03	60	10 *	60 T	6.0		
2N3908	S	N			AM	0.3	A	60	0	0.03	100	10 *	60 T	6.0		
2N3909,A				TABLE8	FET											
2N3910	S	P			SC	0.5	A	50	0	0.2	40	1.0 m	4.0 T	8.0	250/550	46/
2N3911	S	P			SC	0.5	A	40	0	0.2	60	1.0 m	8.0 T	8.0	200/500	46/
2N3912	S	P			SC	0.5	A	30	0	0.2	90	1.0 m	10 T	8.0	200/500	46/
2N3913	S	P			SC	0.4	A	50	0	0.2	40	1.0 m	4.0 T	8.0	250/450	18/
2N3914	S	P			SC	0.4	A	40	0	0.2	60	1.0 m	8.0 T	8.0	200/500	18/
2N3915	S	P			SC	0.4	A	30	0	0.2	90	1.0 m	10 T	8.0	200/500	18/
2N3916	S	N			AP	5.0	C	150	0	0.15	40	.15 A	50 T	30		
2N3917	S	N			AP	20	C	40	0	2.0	30	1.0 A	50 T	80		3/
2N3918	S	N			AP	20	C	40	0	2.0	100	1.0 A	50 T	80		3/
2N3919	S	N			SP	15	C	60	0	10	40	2.0 A	80 T	80		3/
2N3920	S	N			SP	15	C	60	0	10	100	2.0 A	80 T	80		3/
2N3921				TABLE8	FET											

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N3922				TABLE8	FET											
2N3923	S	N			AH	0.8	A	150	0	0.1	30	25 m	40 T	3.5		5/
★2N3924	S	N		2N3924	AHP	7.0	C	18	0	1.5			250 T	20		60/
★2N3925	S	N		2N3924	AHP	10	C	18	0	1.0			250 T	20		102/24
★2N3926	S	N		2N3924	AHP	11.6	C	18	0	1.5			250 T	20		60/36
★2N3927	S	N		2N3924	AHP	23.2	C	18	0	3.0			200 T	45		60/36
2N3928	S	N	2N5337	2N5336	SHP	7.5	C	40	0	3.0	20	1.5 A	200 T	25		
2N3929	S	N	2N5477	2N5477	SHP	30	C	40	0	3.0	20	1.5 A	200 T	25		59/
2N3930	S	P			A	0.4	A	180	0	0.1	80	10 m	40 T	5.0		18/
2N3931	S	P			A	0.7	A	180	0	0.1	80	10 m	40 T	5.0		5/
2N3932	S	N			AH	0.2	A	20	0		40	2.0 m	750 T	0.55		
2N3933	S	N			AH	0.2	A	30	0		60	2.0 m	750 T			
2N3934				TABLE8	FET											
2N3935				TABLE8	FET											
2N3936				TABLE7	THY											
THRU																
2N3940				TABLE7	THY											
2N3941	S	N			AM	0.75	C	45	0	0.05	400	10 *	200 T	6.0		78/
2N3942	S	N			AM	0.75	C	45	0	0.05	400	10 *	200 T	6.0		78/
2N3943	S	N			AM	0.5	C	45	0	0.05	400	10 *	200 T	6.0		71/
2N3944	S	N			AM	0.5	C	45	0	0.05	400	10 *	200 T	6.0		71/
2N3945	S	N	2N5334	2N5334	S	5.0	C	50	0	1.0	40	.15 A	60 T	12		5/
★2N3946	S	N		2N3946	SH	0.36	A	40	0	0.2	50	10 m	250 T	4.0	335/375	18/22
★2N3947	S	N		2N3946	SH	0.36	A	40	0	0.2	100	10 m	300 T	4.0	335/450	18/22
★2N3948	S	N		2N3948	AHP	1.0	A	20	0	0.4	15	50 m	700 T	4.5		39/79
★2N3950	S	N		2N3950	AHP	70	C	35	0	3.3			100 T	20		60/36
2N3953	S	N			AH	0.2	A	12	0	0.03	30	2.0 m	1300 T	1.8		72/
2N3954				TABLE8	FET											
2N3954,A				TABLE8	FET											
2N3955,A				TABLE8	FET											
2N3956				TABLE8	FET											
THRU																
2N3958				TABLE8	FET											
★2N3959	S	N		2N3959	SH	0.4	A	12	0		40	10 m	1300 T	2.5	2.4/1.6	18/22
★2N3960	S	N		2N3959	SH	0.4	A	12	0		40	10 m	160 T	2.5	2.4/1.6	18/22
★2N3961	S	N		2N3375	AHP	10	C	40	0	1.0			400 T	10		102/24
2N3962	S	P			A	0.36	A	60	0	0.2	100	10 *	40 T	6.0		18/
2N3963	S	P			A	0.36	A	80	0	0.2	100	10 *	40 T	6.0		18/
2N3964	S	P			A	0.36	A	45	0	0.2	250	10 *	50 T	6.0		18/
2N3965	S	P			A	0.36	A	60	0	0.2	250	10 *	50 T	6.0		18/
2N3966				TABLE8	FET											
THRU																
2N3972				TABLE8	FET											
2N3973	S	N	2N4400	2N4400	S	0.36	A	30	0	0.4	35	10 m	200 T	7.0	60/110	
2N3974	S	N	2N4401	2N4400	S	0.36	A	30	0	0.4	55	10 m	200 T	7.0	60/110	
2N3975	S	N	2N4400	2N4400	S	0.36	A	30	0	0.4	35	10 m	200 T	7.0	60/200	
2N3976	S	N	2N4401	2N4400	S	0.36	A	30	0	0.4	55	10 m	200 T	7.0	60/250	
2N3977	S	P			SC	0.4	A	10	0	0.1	40	5.0 m	1.0 T	14		46/
2N3978	S	P			SC	0.4	A	20	0	0.1	30	5.0 m	1.0 T	14		46/
2N3979	S	P			SC	0.4	A	35	0	0.1	20	5.0 m	1.0 T	14		46/
2N3980				TABLE10	UJT											
2N3981	S	N	2N2219	2N2218	SH	0.8	A	30	0	1.0	30	.15 A	250 T	8.0	30/35	5/
2N3982	S	N	2N2218	2N2218	SH	0.8	A	20	0	1.0	40	.15 A	250 T	8.0	20/35	5/
2N3983	S	N			AH	0.2	A	12	0	0.03	30	4.0 m	500 T			92/
2N3984	S	N			AH	0.2	A	12	0	0.03	20	4.0 m	400 T			92/
2N3985	S	N			AH	0.2	A	12	0	0.03	20	4.0 m	300 T			92/
2N3986				TABLE7	THY											
THRU																
2N3992				TABLE7	THY											
2N3993				TABLE8	FET											
2N3994				TABLE8	FET											
2N3995	G	P	2N2929	2N2929	AH	0.3	A	12	0		40	2.0 m	600 T			
2N3996	S	N	2N5346	2N5346	SHP	2.0	A	80	0	5.0	40	1.0 A	40 T	150	300/1500	
2N3997	S	N	2N5346	2N5346	SHP	2.0	A	80	0	5.0	80	1.0 A	40 T	150	300/2000	
2N3998	S	N	2N5477	2N5346	SHP	2.0	A	80	0	5.0	40	1.0 A	40 T	150	300/1500	
2N3999	S	N	2N5478	2N5346	SHP	2.0	A	80	0	5.0	80	1.0 A	40 T	150	300/2000	
2N4000	S	N	2N5336	2N5336	SHP	1.0	A	80	0	1.0	30	0.5 A	40 T	60		5/
2N4001	S	N	2N5339	2N5336	SHP	1.0	A	100	0	1.0	40	0.5 A	40 T	60		5/
2N4002	S	N	MJ7000	MJ7000	AP	4.0	A	80	0	30	20	15 A	24 T			63/
2N4003	S	N	MJ7000	MJ7000	AP	4.0	A	100	0	30	20	15 A	24 T			63/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N4004	S	N			AP	1.2	A	80	0	20	30	10 A	24 T			
2N4005	S	N			AP	1.2	A	100	0	20	30	10 A	24 T			
2N4006	S	P			A	0.4	A	6	0	0.1			20 T		180/440	46/
2N4007	S	P			S	0.4	A	15	0	0.1			15 T		180/440	46/
2N4008	S	P			S	0.4	A	30	0	0.1			15 T		180/440	46/
2N4009				2N4006												
2N4010				2N4007												
2N4011				2N4008												
★2N4012	S	N		2N4012	AP	11.6	C	40	0	1.0	4.0	1.0 A	400 T	10		60/36
★2N4013	S	N			SH	0.36	A	40	0	1.0		100 m	300 T	12	20/50	18/22
★2N4014	S	N			SH	0.36	A	50	0	1.0		100 m	300 T	10	20/50	18/22
★2N4015	S	P		2N4015	AM	0.4	A	60	0	0.3	135	1.0 m	200 T	8.0		/654
★2N4016	S	P		2N4015	AM	0.4	A	60	0	0.3	135	1.0 m	200 T	8.0		/654
2N4017	S	P			A	0.6	A	80	0	0.2	100	1.0 m	40 T	6.0		
2N4018	S	P			A	0.4	A	60	0	0.2	100	1.0 m	7.0 E	6.0		
2N4019	S	P			A	0.4	A	45	0	0.2	250	1.0 m	50 T	6.0		
2N4020	S	P			AM	0.4	A	45	0	0.2	250	10 *	50 T	6.0		
2N4021	S	P			AM	0.4	A	60	0	0.2	100	10 *	40 T	6.0		
2N4022	S	P			AM	0.4	A	60	0	0.2	250	10 *	50 T	6.0		
2N4023	S	P			AM	0.4	A	45	0	0.2	250	10 *	50 T	6.0		
2N4024	S	P			AM	0.4	A	60	0	0.2	100	10 *	40 T	6.0		
2N4025	S	P			AM	0.4	A	60	0	0.2	250	10 *	50 T	6.0		
2N4026	S	P			A	0.5	A	60	0	1.0	40	0.1 A	100 T		100/400	18/
2N4027	S	P			A	0.5	A	80	0	1.0	40	0.1 A	100 T		100/400	18/
2N4028	S	P			A	0.5	A	60	0	1.0	100	0.1 A	150 T		100/400	18/
2N4029	S	P			A	0.5	A	80	0	1.0	100	0.1 A	150 T		100/400	18/
2N4030	S	P			A	0.8	A	60	0	1.0	40	0.1 A	100 T		100/400	5/
2N4031	S	P			A	0.8	A	80	0	1.0	40	0.1 A	100 T		100/400	5/
2N4032	S	P			A	0.8	A	60	0	1.0	100	0.1 A	150 T		100/400	5/
2N4033	S	P			A	0.8	A	80	0	1.0	100	0.1 A	150 T		100/400	5/
2N4034	S	P			SH	0.36	A	40	0	0.1	70	10 m	400 T		40/150	18/
2N4035	S	P			SH	0.36	A	40	0	0.1	150	10 m	450 T		40/150	18/
2N4036	S	P	MM4036		S	7.0	A	65	0	1.0	40	.15 A	60 T		110/700	5/
2N4037	S	P	MM4037		S	1.0	A	40	0	1.0	50	.15 A	60 T			5/
2N4038				TABLE8	FET											
2N4039				TABLE8	FET											
2N4040	S	N			AHP	17.5	C	40	0	1.0	10	0.1 A	400 T			
2N4041	S	N			AHP	10	C	40	0	0.5	10	75 m	400 T	8.0		
2N4042	S	N			AM	0.3	C	60	0	0.01	200	10 *	200 T	0.8		70/
2N4043	S	N			AM	0.3	C	45	0	0.01	80	10 *	150 T	0.8		70/
2N4044	S	N			AM	0.4	C	60	0	0.01	200	10 *	200 T	0.8		78/
2N4045	S	N			AM	0.4	C	45	0	0.01	80	10 *	150 T	0.8		78/
2N4046	S	N	2N3052	2N3052	SH	0.8	A	30	0	0.5		100 m	250 T	12	35/60	5/
2N4047	S	N	2N2193	2N2192	SH	0.8	A	50	0	0.5		100 m	250 T	10	35/60	5/
★2N4048	G	P		2N4048	AP	170	C	30	0	60	60	15 A	0.12 E		20k/70k	36/7
★2N4049	G	P		2N4048	AP	170	C	45	0	60	60	15 A	0.12 E		20k/70k	36/7
★2N4050	G	P		2N4048	AP	170	C	60	0	60	60	15 A	0.12 E		20k/70k	36/7
★2N4051	G	P		2N4048	AP	170	C	30	0	60	80	15 A	0.16 E		20k/70k	36/7
★2N4052	G	P		2N4048	AP	170	C	45	0	60	80	15 A	0.16 E		20k/70k	36/7
★2N4053	G	P		2N4048	AP	170	C	60	0	60	80	15 A	0.16 E		20k/70k	36/7
2N4054	S	N	MJ400	MJ400	AP	6.25	C	300	0	0.1	30	50 m	15 T			
2N4055	S	N	MJ400	MJ400	AP	6.25	C	250	0	0.1	30	50 m	15 T			
2N4056	S	N	MJ400	MJ400	AP	6.25	C	200	0	0.1	30	50 m	15 T			
2N4057	S	N	MJ400	MJ400	AP	6.25	C	150	0	0.1	30	50 m	15 T			
2N4058	S	P	MPS6522	MPS6516	A	0.25	A	30	0	0.03	100	0.1 m				92/
2N4059	S	P	MPS6516	MPS6516	A	0.25	A	30	0	0.03	45	1.0 m				92/
2N4060	S	P	MPS6516	MPS6516	A	0.25	A	30	0	0.03	45	1.0 m				92/
2N4061	S	P	MPS6517	MPS6516	A	0.25	A	30	0	0.03	90	1.0 m				92/
2N4062	S	P	MPS6518	MPS6516	A	0.25	A	30	0	0.03	180	1.0 m				92/
2N4063	S	N	2N3439	2N3439	AP	10	C	350	0	1.0	40	.02 A	15 T	10		
2N4064	S	N	2N3440	2N3439	AP	10	C	250	0	1.0	40	.02 A	15 T	10		
2N4065				TABLE8	FET											
THRU																
2N4067				TABLE8	FET											
2N4068	S	N			AH	0.5	A	150	0	0.2	30	30 m	50 T			
2N4069	S	N			AP	1.0	C	150	0	0.2	30	.03 A	50 T			
2N4070	S	N	2N3448	2N3445	AP	65	C	100	0	10	40	5.0 A	20 T	200	500/1600	3/
2N4071	S	N			AP	65	C	150	0	10	40	5.0 A	200 T	200	500/1600	3/
2N4072	S	N		2N4072	AHP	1.5	C	20	0	0.1	10	25 A	300 T	4.0		18/22
2N4073	S	N		2N4072	AHP	1.5	C	20	0	0.15	10	25 A	300 T	4.0		5/31

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N4074	S	N			AH	0.4	A	40	0	0.3	75	10 m				
2N4075	S	N	2N5347	2N5346	AP	30	C	80	0	3.0	30	1.0 A	30 T	70	300/1500	
2N4076	S	N	2N5348	2N5346	AP	30	C	80	0	3.0	50	1.0 A	30 T	70	300/1500	
2N4077	G	N			AP	7.5	C	20	0	1.0	75	0.5 A	1.0 T			
2N4078	G	P			AP	7.5	C	20	0	1.0	75	0.5 A	1.0 T			
2N4079	G	N			AP	7.5	C	20	0	1.0	75	0.5 A	1.0 T			
2N4080	S	P			AHP	0.3	A	15	0	0.05	20	3.0 m	1000 T			72/
2N4081	S	N			AH	0.2	A	40	0		40	2.0 m	600 T			104/
2N4082				TABLE8	FET											
THRU																
2N4085				TABLE8	FET											
2N4086	S	N	MPS6514	MPS6512	A	0.2	A	12	0	0.1	150	2.0 m		12		
2N4087	S	N	MPS6515	MPS6512	A	0.2	A	12	0	0.1	250	2.0 m		12		98/
2N4087A	S	N	MPS6515	MPS6512	A	0.2	A	12	0	0.1	250	2.0 m		12		98/
2N4088				TABLE8	FET											
THRU																
2N4095				TABLE8	FET											
2N4096				TABLE7	THY											
THRU																
2N4098				TABLE7	THY											
2N4099	S	N			AM	0.3	A	55	0	0.01	175	1.0 m	150 T	0.8		70/
2N4100	S	N			AM	0.4	A	55	0	0.01	175	1.0 m	150 T	0.8		78/
2N4101				TABLE7	THY											
THRU																
2N4103				TABLE7	THY											
2N4104	S	N			AH	0.3	A	60	0	0.05			90 T	4.5		18/22
2N4106	G	P	MP2060	MPS2060	A	1.6	A			1.0	70	5.0 m				
2N4108				TABLE7	THY											
THRU																
2N4110				TABLE7	THY											
2N4111	S	N	2N3715	2N3713	AP	30	C	60	0	5.0	40	2.0 A	70 T	120		3/
2N4112	S	N			AP	30	C	60	0	5.0	100	2.0 A	80 T	120		3/
2N4113	S	N	2N3716	2N3713	AP	30	C	80	0	5.0	40	2.0 A	70 T	120		3/
2N4114	S	N			AP	3.0	A	80	0	5.0	100	2.0 A	8000 E	120		3/
2N4115	S	N	2N5428	2N5427	AP	37	C	80	0	5.0	40	2.0 A	2800 E	120		
2N4116	S	N			AP	37	C	80	0	5.0	100	2.0 A	8000 E	120		
2N4117,A				TABLE8	FET											
THRU																
2N4120,A				TABLE8	FET											
2N4121	S	P	2N3905	2N3905	AH	0.2	A	40	0	0.1	70	10 m	400 T		40/150	
2N4122	S	P	2N3906	2N3905	AH	0.2	A	40	0	0.1	150	10 m	450 T		40/150	
2N4123	S	N		2N4123	SH	0.31	A	30	0	0.2	50	2.0 m	250 T	4.0		92/29
2N4124	S	N		2N4123	SH	0.31	A	25	0	0.2	120	2.0 m	300 T	4.0		92/29
2N4125	S	P		2N4125	SH	0.31	A	30	0	0.2	50	2.0 m	200 T	4.5		92/29
2N4126	S	P		2N4125	SH	0.31	A	25	0	0.2	120	2.0 m	250 T	4.5		92/29
2N4127	S	N			AP	25	C	40	0	2.0	10	0.2 A	300 T	25		
2N4128	S	N			AP	40	C	40	0	4.0	10	0.2 A	200 T	45		
2N4130	S	N	2N5869	2N5867	AP	120	C	65	0	10	10	2.0 A	12.5 E	200		3/1
2N4131	S	N			AP	60	C	80	0	5.0	10	1.0 A	1500 E	110		37/
2N4132	S	N			AHP	7.5	C	80	0	0.6	10	0.2 A	200 T	15		37/
2N4133	S	N			AHP	3.0	C	80	0	0.6	10	0.2 A	200 T	15		5/
2N4134	S	N			AH	0.2	A	30	0	0.03	25	4.0 m	350 T	1.2		72/
2N4135	S	N			AH	0.2	A	30	0	0.03	25	4.0 m	425 T	1.2		72/
2N4136																
2N4137	S	N			SP	0.36	A	40	0	0.2	40	10 m	500 T		12/12	18/
2N4138	S	N			SC	0.3	A	30	0	0.1	50	1.0 m	20 T	12		46/
2N4139				TABLE8	FET											
2N4140	S	N	2N4400	2N4400	AH	0.3	A	30	0	0.2		150 m	250 T	8.0	50/310	
2N4141	S	N	2N4401	2N4400	AH	0.3	A	30	0	0.2		150 m	250 T	8.0	50/310	
2N4142	S	P	2N4402	2N4402	AH	0.3	A	40	0	0.2		150 m	200 T	8.0	50/110	
2N4143	S	P	2N4403	2N4402	AH	0.3	A	40	0	0.2		150 m	200 T	8.0	50/110	
2N4144				TABLE7	THY											
THRU																
2N4149				TABLE7	THY											
2N4150	S	N	2N5337	2N5336	AP	5.0	C	80	0	5.0	40	5.0 A	15 T			5/
2N4151				TABLE7	THY											
THRU																
2N4206				TABLE7	THY											
2N4207	S	P			SH	0.3	A	6	0	0.05	50	10 m	650 T	3.0	15/15	18/
2N4208	S	P			SH	0.3	A	12	0	0.05	30	10 m	700 T	3.0	15/20	18/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N4209	S	P			SH	0.3	A	15	0	0.05	50	10 m	850 T	3.0	15/20	18/
2N4210	S	N	MJ7000	MJ7000	AP	100	C	60	0	20	20	10 A	10 T	850		63/
2N4211	S	N	MJ7000	MJ7000	AP	100	C	80	0	20	20	10 A	10 T	850		63/
2N4212 THRU				TABLE7	THY											
2N4219				TABLE7	THY											
2N4220,A THRU				TABLE8	FET											
2N4224,A				TABLE8	FET											
2N4225	S	N	2N5334	2N5334	AP	5.0	C	40	0	3.0	40	1.0 A	150 T	25	35/75	
2N4226	S	N	2N5334	2N5334	AP	5.0	C	60	0	3.0	40	1.0 A	150 T	25	35/75	
2N4227	S	N	2N4400	2N4400	S	0.3	A	30	0	0.2		150 m	250 T	8.0	50/310	
★2N4228	S	P	2N4402	2N4402	AH	0.3	A	40	0	0.2		150 m	200 T	8.0	50/110	
★2N4231	S	N		2N4231	AP	35	C	40	0	3.0	25	1.5 A	1.0 T	200		66/80
★2N4231A	S	N			AP	75	C	40	0	5.0	25	1.5 A	4.0 T	300		66/80
★2N4232	S	N		2N4231	AP	35	C	60	0	3.0	25	1.5 A	1.0 T	200		66/80
★2N4232A	S	N			AP	75	C	60	0	5.0	25	1.5 A	4.0 T	300		66/80
★2N4233	S	N		2N4231	AP	35	C	80	0	3.0	25	1.5 A	1.0 T	200		66/80
★2N4233A	S	N			AP	75	C	80	0	5.0	25	1.5 A	4.0 T	300		66/80
★2N4234	S	P		2N4234	SP	1.0	A	40	0	1.0	30	250 m	3.0 T	100		5/31
★2N4235	S	P		2N4234	SP	1.0	A	60	0	1.0	30	250 m	3.0 T	100		5/31
★2N4236	S	P		2N4234	SP	1.0	A	80	0	1.0	30	250 m	3.0 T	100		5/31
★2N4237	S	N		2N4237	AP	5.0	C	40	0	1.0	40	500 m	10 T	100		5/31
★2N4238	S	N		2N4237	AP	5.0	C	60	0	1.0	40	500 m	2.0 T	100		5/31
★2N4239	S	N		2N4237	AP	5.0	C	60	0	1.0	40	500 m	2.0 T	100		5/31
2N4240	S	N	2N3739	2N3738	AP	35	C	300	0	2.0	30	.75 A	2.0 T	120	500/9000	66/80
2N4241	G	P			A	37.5	C	20	0	5.0	60	300 m				3/
2N4242	G	P			AP	10	A	70	S	10	40	5.0 A	0.5 T			3/
2N4243	G	P			AP	10	A	55	S	10	40	5.0 A	0.5 T			3/
2N4244	G	P			AP	10	A	40	S	10	40	5.0 A	0.5 T			3/
2N4245	G	P			AP	10	A	70	S	10	60	5.0 A	0.5 T			3/
2N4246	G	P			AP	10	A	55	S	10	60	5.0 A	0.5 T			3/
2N4247	G	P			AP	10	A	40	S	10	60	5.0 A	0.5 T			3/
2N4248	S	P	2N5086	2N5086	A	0.2	A	40	0	0.1			40 T	6.0		
2N4249	S	P	2N5086	2N5086	A	0.2	A	60	0	0.1			40 T	6.0		
2N4250	S	P	2N5087	2N5086	A	0.2	A	40	0	0.1			40 T	6.0		
2N4251	S	N			S	0.25	A	10	0	0.1	100	10 m	1300 T	2.0	20/60	46/
2N4252	S	N			AH	0.2	A	18	0	0.05	50	2.0 m	600 T			72/
2N4253	S	N			AH	0.2	A	18	0	0.05	30	2.0 m	600 T			72/
2N4254	S	N	MPS6547	MPS6546	A	0.2	A	18	0	0.05	50	2.0 m	600 T			92/
2N4255	S	N	MPS6547	MPS6546	A	0.2	A	18	0	0.05	30	2.0 m	600 T			92/
2N4256	S	N	2N3904	2N3903	A	0.2	A	30	S	0.1	100	2.0 m			180/3500	98/
2N4257	S	P			SH	0.2	A	6	0	0.05	30	10 m	500 T		15/15	
2N4257A	S	P			SH	0.5	C	6	0	0.05	30	10 m	500 T		15/15	
2N4258	S	P			SH	0.2	A	12	0	0.05	30	10 m	700 T		15/20	
2N4258A	S	P			SH	0.5	C	12	0	0.05	30	10 m	500 T		15/18	
2N4259	S	N			AH	0.175	A	30	0		60	20 m	750 T			
★2N4260	S	P			SH	0.2	A	15	0	0.03	30	10 m	1500 T	2.5	1.2/1.2	72/20
★2N4261	S	P			SH	0.2	A	15	0	0.03	30	15 A	2000 T	2.5	1.2/1.2	72/20
★2N4262	S	N			AP	1.5	C	10	0	0.2	75	0.3 A	600 T			102/
★2N4263	S	N			AP	1.5	C	10	0	0.2	75	0.3 A	800 T			102/
★2N4264	S	N		2N4264	S	0.31	A	15	0	0.2	40	10 m	300 T	4.0	25/35	92/29
★2N4265	S	P		2N4264	SH	0.31	A	12	0	0.2	100	15 A	300 T	4.0	25/35	92/29
2N4267				TABLE8	FET											
2N4268				TABLE8	FET											
2N4269	S	N			A	0.36	A	140	0	0.03		10 m		5.0		18/
2N4270	S	N			A	0.58	A	140	0	0.03		10 m		5.0		5/
2N4271	S	N	2N5682	2N5681	AP	5.0	C	140	0	1.0	20	0.2 A	20 T	25		5/
2N4272	S	N	2N5682	2N5681	AP	5.0	C	140	0	2.5	20	1.0 A	10 T	75		5/
2N4273	S	N			AP	25	C	140	0	2.5	20	1.0 A	10 T	75		66/
2N4274	S	N			SH	0.28	A	12	0	0.1	18	100 m	400 T		12/12	
2N4275	S	N			SH	0.28	A	15	0	0.1	18	100 m	400 T		12/12	
★2N4276	G	P		2N4276	AP	170	C	20	0	60	60	15 A	0.12 E		20k/70k	3/
★2N4277	G	P		2N4276	AP	170	C	20	0	60	80	15 A	0.16 E		20k/70k	3/
★2N4278	G	P		2N4276	AP	170	C	30	0	60	60	15 A	0.12 E		20k/70k	3/
★2N4279	G	P		2N4276	AP	170	C	30	0	60	80	15 A	0.16 E		20k/70k	3/
★2N4280	G	P		2N4276	AP	170	C	45	0	60	60	15 A	0.12 E		20k/70k	3/
★2N4281	G	P		2N4276	AP	170	C	45	0	60	80	15 A	0.16 E		20k/70k	3/
★2N4282	G	P		2N4276	AP	170	C	60	0	60	60	15 A	0.12 E		20k/70k	3/
★2N4283	G	P		2N4276	AP	170	C	60	0	60	80	15 A	0.16 E		20k/70k	3/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	Case No.
2N4284	S	P			A	0.25	A	25	0	0.05	35	1.0 m	7.0	10			
2N4285	S	P			A	0.25	A	35	0	0.05	35	1.0 m	7.0	10			
2N4286	S	N	MPS6515	MPS6512	A	0.25	A	25	0	0.1	150	1.0 m	40 T	6.0			
2N4287	S	N	MPS6566	MPS6565	A	0.25	A	45	0	0.1	150	1.0 m	40 T	6.0			
2N4288	S	P	MPS6518	MPS6516	A	0.25	A	25	0	0.1	150	1.0 m	40 T	8.0			
2N4289	S	P	2N5086	2N5086	A	0.25	A	45	0	0.1	150	1.0 m	40 T	8.0			
2N4290	S	P	MPS6533	MPS6530	A	0.25	A	20	0	0.6	50	100 m	100 T	10			
2N4291	S	P	MPS6534	MPS6530	A	0.25	A	30	0	0.6	100	100 m	100 T	10			
2N4292	S	N	MPS918	MPS918	A	0.2	A	15	0	0.05	20	3.0 m	600 T	2.2			
2N4293	S	N	MPS918	MPS918	A	0.2	A	15	0	0.05	20	3.0 m	600 T	2.2			
2N4294	S	N	2N4264	2N4264	SH	0.2	A	12	0	0.2	30	10 m	400 T	5.0	15/20		
2N4295	S	N	2N4264	2N4264	SH	0.2	A	15	0	0.2	40	10 m	500 T	4.0	12/15		
2N4296	S	N	2N3738	2N3738	SP	20	C	250	0	1.0	50	.05 A	20 T		7k/10k	66/	
2N4297	S	N	2N3738	2N3738	AP	20	C	250	0	1.0	75	.05 A	20 T		7k/10k	66/	
2N4298	S	N	2N3739	2N3739	AP	20	C	350	0	1.0	25	.05 A	20 T		7k/10k	66/	
2N4299	S	N	2N3739	2N3739	AP	20	C	350	0	1.0	50	.05 A	20 T		7k/10k	66/	
2N4300	S	N	2N5336	2N5336	AP	15	C	80	0	2.0	30	1.0 A	30 T			5/	
2N4301	S	N	2N5477	2N5477	AP	50	C	80	0	10	30	5.0 A	40 T			61/	
2N4302				TABLE8	FET												
THRU																	
2N4304				TABLE8	FET												
2N4305	S	N	2N5337	2N5336	AP	1.5	A	80	0	5.0	50	1.0 A	100 T	100	140/400		
2N4306	S	N			AP	4.0	A	80	0	5.0	50	1.0 A	100 T	100	140/400	5/	
2N4307	S	N	2N5337	2N5336	AP	1.5	A	60	0	5.0	50	1.0 A	100 T	100	140/400		
2N4308	S	N			AP	4.0	A	60	0	5.0	50	1.0 A	100 T	100	140/400	5/	
2N4309	S	N	2N5337	2N5336	AP	1.5	A	80	0	5.0	50	1.0 A	100 T	100	140/400		
2N4310	S	N			AP	4.0	A	80	0	5.0	40	1.0 A	100 T	100	140/400	5/	
2N4311	S	N	2N5337	2N5336	AP	1.5	A	60	0	5.0	40	1.0 A	100 T	100	140/400		
2N4312	S	N			AP	4.0	A	60	0	5.0	40	1.0 A	100 T	100	140/400	5/	
2N4313	S	P			SC	0.2	A	12	0	0.1	30	30 m	700 T		20/25		
2N4314	S	P			AP	1.0	A	65	0	1.0	50	.15 A	60 T			5/	
2N4316				TABLE7	THY												
THRU																	
2N4319				TABLE7	THY												
2N4338				TABLE8	FET												
THRU																	
2N4343				TABLE8	FET												
2N4346					AP	5.0	A	60	0	10						3/	
★2N4347	S	N			AP	100	C	120	0	5.0	15	2.0 A	0.2 T			3/	
★2N4348	S	N			AP	120	C	120	0	10	15	5.0 A	0.2 T				11
2N4350	S	N			AP	7.0	C	40	0	0.350	10	.35 A	300 T	10		5	31
2N4351																	
2N4352				TABLE8	FET												
2N4353																	
2N4354	S	P			A	0.35	A	60	0	0.5	25	0.1 m	100 T	30	100/400		
2N4355	S	P			A	0.35	A	60	0	0.5	60	0.1 m	100 T	30	100/400		
2N4356	S	P			A	0.35	A	80	0	0.5	25	0.1 m	100 T	30	100/400		
2N4357	S	P			A	0.4	A	240	0	0.1	80	10 m	40 T	7.0		18/	
2N4358	S	P			A	0.7	A	240	0	0.1	80	10 m	40 T	7.0		39/	
2N4359	S	P			A	0.36	A	45	0	0.05	50	1.0 m	20 T	6.0		18/	
2N4360				TABLE8	FET												
2N4361				TABLE7	THY												
THRU																	
2N4380				TABLE7	THY												
2N4381				TABLE8	FET												
2N4382				TABLE8	FET												
2N4383	S	N			AH	0.8	A	30	0	0.8	100	10 *	300 T	8.0		5/	
2N4384	S	N			AH	0.5	A	30	0	0.8	100	10 *	300 T	8.0		18/	
2N4385	S	N			AH	0.8	A	30	0	0.8	40	10 *	300 T	8.0		5/	
2N4386	S	N			AH	0.5	A	30	0	0.8	40	10 *	300 T	8.0		18/	
2N4387	S	P	2N3740	2N3740		20	A	40	0	2.0	25	500 m	25 T	275		66/	
2N4388	S	P	2N3740	2N3740		20	A	60	0	2.0	25	500 m	25 T	275		66/	
2N4389	S	P			SH	0.2	A	12	0	0.1	30	10 m	400 T	6.0	20/90		
2N4390	S	N			S	0.5	A	120	0	0.1	20	2.0 m	50 T		650/1300	104/	
2N4391				TABLE8	FET												
THRU																	
2N4393				TABLE8	FET												
2N4395	S	N	2N3716	2N3713	AP	62.5	C	40	0	5.0	50	2.0 A	4.0 T		800/1500	3/	
2N4396	S	N	2N3716	2N3713	AP	62.5	C	60	0	5.0	40	2.0 A	4.0 T		1000/2000	3/	
2N4397	S	N			AM	0.2	A	40	0		40	2.0 m	600 T			104/	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
★2N4398	S	P		2N4398	AP	200	C	40	0	30	15	15 A	4.0 T		400/2100	/12
★2N4399	S	P		2N4398	AP	200	C	60	0	30	15	15 A	4.0 T		400/2100	/12
★2N4400	S	N		2N4400	SH	0.31	A	40	0	0.6	50	150 m	200 T			92/29
★2N4401	S	N		2N4400	SH	0.31	A	40	0	0.6	100	150 m	250 T			92/29
★2N4402	S	P		2N4402	SH	0.31	A	40	0	0.6	50	150 m	150 T			92/29
★2N4403	S	P		2N4402	SH	0.31	A	40	0	0.6	100	150 m	200 T			92/29
★2N4404	S	P		2N4404	A	5.0	C	80	0	0.5	40	150 m	200 T			39/79
★2N4405	S	P		2N4404	A	5.0	C	80	0	0.5	100	150 m	200 T			39/79
★2N4406	S	P		2N4406	A	5.0	C	80	0	0.15	30	500 m	150 T			39/79
★2N4407	S	P		2N4406	A	5.0	C	80	0	0.15	80	500 m	150 T			39/79
★2N4409	S	N		2N4409	S	0.31	A	50	0	0.25	60	1.0 m	60 T			92/29
★2N4410	S	N		2N4409	S	0.31	A	80	0	0.25	60	1.0 m	60 T			92/29
2N4411	S	P			S	0.15	A	12	0	0.025	40	0.5 m	400 T	0.7		72/
2N4412	S	N			AH	0.6	A	30	0	0.6	100	10 *	100 T	10		5/
2N4412A	S	P			AH	0.6	A	60	0	0.6	100	10 *	20 T	10		5/
2N4413	S	P			AH	0.4	A	30	0	0.6	100	10 *	20 T	10		18/
2N4413A	S	P			AH	0.4	A	60	0	0.6	100	10 *	20 T	10		18/
2N4414	S	P			AH	0.6	A	30	0	0.6			100 T	10		5/
2N4414A	S	P			AH	0.6	A	60	0	0.6	40	10 *	20 T	10		5/
2N4415	S	P			AH	0.4	A	30	0	0.6			100 T	10		18/
2N4415A	S	P			AH	0.4	A	60	0	0.6	40	10 *	20 T	10		18/
2N4416																
2N4416A				TABLE8	FET											
2N4417																
2N4418	S	N	2N4264	2N4264	S	0.25	A	40	S	0.2	40	10 m	500 T		20/22	
2N4419	S	N	2N4264	2N4264	S	0.25	A	30	S	0.2	30	10 m	400 T		22/28	
2N4420	S	N	MPS3646	MPS3646	S	0.25	A	40	S	0.2	30	30 m	350 T		16/20	
2N4421	S	N	MPS3646	MPS3646	S	0.25	A	30	S	0.2	25	30 m	300 T		18/24	
2N4422	S	N	MPS3646	MPS3646	S	0.25	A	40	S	0.2	30	30 m	350 T		18/28	
2N4423	S	N	MPS3640	MPS3646	S	0.25	A	12	S	0.2	40	30 m	400 T		40/50	
2N4424	S	N	MPS3711	MPS3707	S	0.36	A	40	0	0.5	180	2.0 m				98/
2N4425	S	N	MPS3711	MPS3707	S	0.56	A	40	0	0.5	180	2.0 m				
★2N4427	S	N		2N4427	AP	3.5	C	20	0	0.4	10	0.1 A	500 T	4.0		39/79
★2N4428	S	N		2N4428	AP	3.5	C	35	0	0.425	20	.05 A	700 T	3.5		39/79
2N4429	S	N			AP	5.0	C	35	0	0.425	20	.05 A	700 T	3.5		
2N4430	S	N			AP	10	C	40	0	1.0	20	0.1 A	600 T	5.0		
2N4431	S	N			AP	18	C	40	0	2.0	20	0.1 A	600 T	10		
2N4432	S	N			AH	0.6	A	30	0	0.2	40	6.0 m	65 T	4.2		5/
2N4432A	S	N			AH	0.6	A	30	0	0.2	80	6.0 m	70 T	10		5/
2N4436	S	N			AHP	0.2	A	30	0	0.5	40	150 m	250 T	8.0	60/150	
2N4437	S	N			AHP	0.2	A	30	0	0.5	100	150 m	250 T	8.0	60/150	
2N4438	S	N			A	1.0	A	300	0	0.2	40	50 m	30 T	20		
2N4439	S	N			A	1.0	A	300	0	0.2	100	50 m	30 T	20		39/
2N4440	S	N			AP	11.6	C	40	0	1.5	10	125 A	400 T	12		39/
2N4441				TABLE7	THY											60/
THRU																
2N4444				TABLE7	THY											
2N4445				TABLE8	FET											
THRU																
2N4448				TABLE8	FET											
2N4449	S	N			SH	0.3	A	40	0	0.2	40	10 m	500 T			46/
2N4450	S	N			SH	0.3	C	30	0	0.5	75	10 m	250 T			46/
2N4451	S	P			S	0.3	A	12	0	0.1	40	30 m	400 T			46/
2N4452	S	P			S	0.35	A	45	0	0.6	115	50 m	200 T			46/
2N4453	S	P			S	0.3	A	18	0	0.2	40	30 m	400 T		75/170	46/
2N4576	S	N	2N3716	2N3713	AHP	150	C	80	0		50	1.0 A	1.5 E			
2N4851				TABLE10	UJT											
THRU																
2N4853				TABLE10	UJT											
★2N4854					SH	0.3	A	40	0	0.6	50	1.0 m	200 T		60/350	/654
★2N4855					SH	0.3	A	40	0	0.6	25	1.0 m	200 T		60/350	/654
2N4856				TABLE8	FET											
THRU																
2N4861				TABLE8	FET											
2N4862	S	N	2N5339	2N5336	AP			120	0	2.0	50	0.5 A	50 T	50		46/
2N4863	S	N	2N5334	2N5334	AP			120	0	2.0	50	0.5 A	50 T	50		5/
2N4864	S	N	2N5430	2N5336	AP			120	0	2.0	50	0.5 A	50 T	50		66/
2N4865	S	N			SP	350	C	80	0	90	10	70 A	10 T			
2N4866	S	N			SP	350	C	120	0	90	10	70 A	10 T			
2N4867,A				TABLE8	FET											

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No. Case No.
THRU																
2N4869,A				TABLE8	FET											
2N4870				TABLE10	UJT											
2N4871				TABLE10	UJT											
2N4872	S	P			SH	0.7	C	12	0	0.05	50	10 m		3.0	15/20	18/
2N4873	S	N			SH	0.36	A	15	0	0.2	110	10 m		4.0	12/13	18/
2N4874	S	N			AH	0.72	A	20	0	0.2			900 T			39/
2N4875	S	N			AH	0.72	A	25	0	0.2			800 T			39/
2N4876	S	N			AH	0.72	A	30	0	0.2			650 T			39/
★2N4877	S	N		2N4877	AP	10	C	60	0	4.0	20	4.0 A	4.0 T		100/6500	39/
2N4878	S	N			AM	0.3	C	60	0	0.01	200	10 *	200 T			71/
2N4879	S	N			AM	0.3	C	55	0	0.01	150	10 *	150 T			71/
2N4880	S	N			AM	0.3	C	45	0	0.01	80	10 *	150 T			71/
2N4881				TABLE8	FET											
THRU																
2N4886				TABLE8	FET											
2N4888	S	P			A	0.3	A	150	0	0.1	40	10 m	30 T	4.0		
2N4889	S	P			A	0.3	A	150	0	0.1	80	10 m	40 T	4.0		
★2N4890	S	P		2N4890	S	1.0	A	40	0	0.5	50	150 m	100 T	15	100/270	5/
2N4891				TABLE10	UJT											
THRU																
2N4894				TABLE10	UJT											
2N4895	S	N			SP	4.0	C	60	0	5.0	40	2.0 A	50 T	80	350/650	39/
2N4896	S	N	2N5337	2N5336	SP	4.0	C	60	0	5.0	100	2.0 A	80 T	80	350/650	39/
2N4897	S	N	2N5337	2N5336	SP	4.0	C	80	0	5.0	40	2.0 A	50 T	80	350/650	39/
★2N4898	S	P		2N4898	AP	25	C	40	0	1.0	20	0.5 A	3.0 T	100		66/80
★2N4899	S	P		2N4898	AP	25	C	60	0	1.0	20	0.5 A	3.0 T	100		66/80
★2N4900	S	P		2N4898	AP	25	C	80	0	1.0	20	0.5 A	3.0 T	100		66/80
★2N4901	S	P		2N4901	AP	87.5	C	40	0	5.0	20	1.0 A	4.0 T			3/11
★2N4902	S	P		2N4901	AP	87.5	C	60	0	5.0	20	1.0 A	4.0 T			3/11
★2N4903	S	P		2N4901	AP	87.5	C	80	0	5.0	20	1.0 A	4.0 T			3/11
★2N4904	S	P		2N4904	AP	87.5	C	40	0	5.0	25	2.5 A	4.0 T			3/11
★2N4905	S	P		2N4904	AP	87.5	C	60	0	5.0	25	2.5 A	4.0 T			3/11
★2N4906	S	P		2N4904	AP	87.5	C	80	0	5.0	25	2.5 A	4.0 T			3/11
2N4907	S	P			AP	150	C	40	0	10	20	4.0 A	4.0 T	600		3/
2N4908	S	P			AP	150	C	60	0	10	20	4.0 A	4.0 T	600		3/
2N4909	S	P			AP	150	C	80	0	10	20	4.0 A	4.0 T	600		3/
★2N4910	S	N		2N4910	AP	25	C	40	0	1.0	20	0.5 A	3.0 T	100		66/80
★2N4911	S	N		2N4910	AP	25	C	60	0	1.0	20	0.5 A	3.0 T	100		66/80
★2N4912	S	N		2N4910	AP	25	C	80	0	1.0	20	0.5 A	3.0 T	100		66/80
★2N4913	S	N		2N4913	AP	87.5	C	40	0	5.0	25	2.5 A	4.0 T			3/11
★2N4914	S	N		2N4913	AP	87.5	C	60	0	5.0	25	2.5 A	4.0 T			3/11
★2N4915	S	N		2N4913	AP	87.5	C	80	0	5.0	25	2.5 A	4.0 T			3/11
2N4916	S	P			SH	0.5	C	30	0	0.1	70	10 m	400 T		40/150	
2N4917	S	P			SH	0.5	C	30	0	0.1	150	10 m	450 T		40/150	
★2N4918	S	P		2N4918	AP	30	C	40	0	1.0	20	0.5 A	3.0 T	100		/77
★2N4919	S	P		2N4918	AP	30	C	60	0	1.0	20	0.5 A	3.0 T	100		/77
★2N4920	S	P		2N4918	AP	30	C	80	0	1.0	20	0.5 A	3.0 T	100		/77
★2N4921	S	N		2N4921	AP	30	C	40	0	1.0	20	0.5 A	3.0 T	100		/77
★2N4922	S	N		2N4921	AP	30	C	60	0	1.0	20	0.5 A	3.0 T	100		/77
★2N4923	S	N		2N4921	AP	30	C	80	0	1.0	20	0.5 A	3.0 T	100		/77
★2N4924	S	N		2N4924	AH	1.0	A	100	0	0.2	40	150 m	100 T			39/79
★2N4925	S	N		2N4924	AH	1.0	A	150	0	0.2	40	150 m	100 T			39/79
★2N4926	S	N		2N4926	AH	5.0	A	200	0	0.05	20	30 m	300 T			39/79
★2N4927	S	N		2N4926	AH	5.0	A	250	0	0.05	20	30 m	300 T			39/79
★2N4928	S	P		2N4928	A	3.0	C	100	0	0.1	25	10 m	100 T			39/79
★2N4929	S	P		2N4928	A	5.0	C	150	0	0.5	25	10 m	100 T			39/79
★2N4930	S	P		2N4928	A	5.0	C	200	0	0.5	20	10 m	20 T			39/79
★2N4931	S	P		2N4928	A	5.0	C	250	0	0.5	20	10 m	20 T			39/79
2N4932	S	N	2N5477	2N5477	AP	70	C	25	0	3.3	10	1.0 A	100 T	120		60/
2N4933	S	N	2N5477	2N5477	AP	70	C	35	0	3.3	10	1.0 A	100 T	85		60/
2N4934	S	N			AH	0.2	A	30	0		40	2.0 m	700 T			104/
2N4935	S	N			AH	0.2	A	40	0		60	2.0 m	700 T			104/
2N4936	S	N			AH	0.2	A	40	0		60	2.0 m	700 T			104/
★2N4937	S	P		2N4937	AM	0.6	A	40	0	0.05	50	1.0 m	300 T			/654
★2N4938	S	P		2N4937	AM	0.6	A	40	0	0.05	50	1.0 m	300 T			/654
★2N4939	S	P		2N4937	AM	0.6	A	40	0	0.05	50	1.0 m	300 T			/654
★2N4940	S	P		2N4937	AM	0.6	A	40	0	0.05	50	1.0 m	300 T			89/610
★2N4941	S	P		2N4937	AM	0.6	A	40	0	0.05	50	1.0 m	300 T			89/610
★2N4942	S	P		2N4937	AM	0.6	A	40	0	0.05	50	1.0 m	300 T			89/610

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
2N4943	S	N			AP	0.8	A	80	0	1.0	100	150 m	45 T			5/
2N4944	S	N			A	0.6	C	40	0	0.5	40	150 m	60 T			106/
2N4945	S	N			A	0.6	C	60	0	0.5	40	150 m	60 T			106/
2N4946	S	N			A	0.6	C	40	0	0.5	100	150 m	60 T			
2N4947				TABLE10	UJT											
2N4948				TABLE10	UJT											
2N4949				TABLE10	UJT											
2N4950	S	N	MJ7000	MJ7000	SP	300	C	60	0	70	10	50 A	0.1 T		100/200	
2N4951	S	N			A	0.36	A	30	0	0.5	60	150 m	250 T		40/400	98/
2N4952	S	N			A	0.36	A	30	0	0.5	100	150 m	250 T		40/400	98/
2N4953	S	N			A	0.36	A	30	0	0.5	200	150 m	250 T		40/400	98/
2N4954	S	N			A	0.36	A	30	0	0.5	60	150 m	250 T		40/400	98/
2N4955	S	N			AL	0.75	C	25	0	0.03	60	10 *	60 T			
2N4956	S	N			AM	0.75	C	25	0	0.03	60	10 *	60 T			
★2N4957	S	P		2N4957	A	0.2	A	30	0	0.03	20	2.0 m	1200 T			72/20
★2N4958	S	P		2N4957	A	0.2	A	30	0	0.03	20	2.0 m	1000 T			72/20
★2N4959	S	P		2N4957	A	0.2	A	30	0	0.03	20	2.0 m	1000 T			72/20
2N4960	S	N			A	0.8	A	60	0	1.0	100	150 m	250 T		150/1000	39/
2N4961	S	N			A	0.5	A	80	0	1.0	100	150 m	250 T		150/1000	39/
2N4962	S	N			A	0.8	A	60	0	1.0	100	150 m	250 T		150/1000	18/
2N4963	S	N			A	0.5	A	80	0	1.0	100	150 m	250 T		150/1000	18/
2N4964	S	P			A	0.2	A	40	0	0.1	30	10 *	60 T			106/
2N4965	S	P			A	0.2	A	40	0	0.1	80	10 *	60 T			106/
2N4966	S	N			A	0.2	A	40	0	0.03	40	10 *	60 T			106/
2N4967	S	N			A	0.2	A	40	0	0.03	100	10 *	40 T			
2N4968	S	N			A	0.2	A	25	0	0.03	40	10 *	40 T			106/
2N4969	S	N			SH	0.2	A	30	0	0.5	40	150 m	200 T	8.0	55/380	106/
2N4970	S	N			SH	0.2	A	30	0	0.5	100	150 m	200 T	8.0	65/390	106/
2N4971	S	P			SH	0.2	A	40	0	0.5	40	150 m	200 T	8.0	80/200	106/
2N4972	S	P			SH	0.2	A	40	0	0.5	100	150 m	200 T	8.0	90/235	106/
2N4973	S	P			AH	0.2	A	15	0	0.03	20	3.0 m	400 T			106/
★2N4974	S	P		2N4974	AL	0.8	A	30	0	1.0	5000	1.0 *	175 T	8.0		12/34
★2N4975	S	P		2N4974	AL	0.8	A	30	0	1.0	1000	1.0 *	175 T	8.0		12/34
2N4976	S	N			AHP	5.0	C	30	0	0.4	20	50 m	1000 T	3.0		
2N4977				TABLE8	FET											
THRU																
2N4979				TABLE8	FET											
2N4980	S	P			SC	0.4	A	30	0	0.1	60	1.0 m	10 T	10		46/
2N4981	S	P			SC	0.4	A	50	0	0.1	40	1.0 m	5.0 T	10		46/
2N4982	S	P			SC	0.4	A	70	0	0.1	30	1.0 m	3.0 T	10		46/
2N4983				TABLE7	THY											
THRU																
2N4993				TABLE7	THY											
2N4994	S	N			AH	0.2	A	45	0	0.03	40	10 m	200 T	3.5		
2N4995	S	N			AH	0.2	A	45	0	0.03	100	10 m	200 T	3.5		
2N4996	S	N			AH	0.2	A	18	0	0.05	50	2 m	600 T			
2N4997	S	N			AH	0.2	A	18	0	0.05	30	2 m	600 T			
2N4998	S	N	2N5347	2N5346	AP	30	C	80	0	2.0	30	1.0 A	50 T			59/
2N4999	S	P	2N6186	2N6186	AP	30	C	80	0	2.0	30	1.0 A	50 T			59/
2N5000	S	N	2N5348	2N5346	AP	30	C	80	0	2.0	70	1.0 A	60 T			59/
2N5001	S	P	2N6187	2N6186	AP	30	C	80	0	2.0	70	1.0 A	60 T			59/
2N5002	S	N	2N5347	2N5346	AP	50	C	80	0	5.0	30	2.5 A	60 T			59/
2N5003	S	P	2N6186	2N6186	AP	50	C	80	0	5.0	30	2.5 A	60 T			59/
2N5004	S	N	2N5348	2N5346	AP	50	C	80	0	5.0	70	2.5 A	70 T			59/
2N5005	S	P	2N6187	2N6186	AP	50	C	80	0	5.0	70	2.5 A	70 T			59/
2N5006	S	N			AP	100	C	80	0	10	30	5.0 A	30 T			
2N5007	S	P			AP	100	C	80	0	10	30	5.0 A	30 T			
2N5008	S	N			AP	100	C	80	0	10	70	5.0 A	40 T			
2N5009	S	P			AP	100	C	80	0	10	70	5.0 A	40 T			
2N5010	S	N			A	2.0	C	500	R	0.5	30	25 m	20 T	30		5/
2N5011	S	N			A	2.0	C	600	R	0.5	30	25 m	20 T	30		5/
2N5012	S	N			A	2.0	C	700	R	0.5	30	25 m	20 T	30		5/
2N5013	S	N			A	2.0	C	800	R	0.5	30	20 m	20 T	30		5/
2N5014	S	N			A	2.0	C	900	R	0.5	30	20 m	20 T	30		5/
2N5015	S	N			A	2.0	C	1000	R	0.5	30	20 m	20 T	30		5/
★2N5016	S	N		2N5016	AHP	30	C	30	0	4.5	10	0.5 A	500 T	25		60/36
2N5017	S	N			AHP	30	C	30	0	4.5	10	0.5 A	500 T	25		
2N5018				TABLE8	FET											
THRU																
2N5021				TABLE8	FET											

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	Case No.
2N5022	S	P			SH	1.0	A	50	0	0.5	25	500 m	1700 T	25	45/90	5/	
2N5023	S	P			SH	1.0	A	30	0	0.5	40	500 m	2000 T	25	45/90	39/	
2N5024	S	N			SH	0.2	A	10	0	0.15	25	10 m	1300 T			72/	
2N5025	S	N			AHP	45	C	75	0	5.0	20	2.0 A	150 T			60/	
2N5026	S	N			AHP	45	C	90	0	5.0	20	2.0 A	150 T			60/	
2N5027	S	N			S	0.32	A	30	0	0.35	50	150 m	250 T			98/	
2N5028	S	N			S	0.32	A	30	0	0.35	100	150 m	250 T			98/	
2N5029	S	N				0.32	A	15	0	0.2	40	10 m	500 T			98/	
2N5030	S	N				0.32	A	12	0	0.2	30	10 m	400 T			98/	
★2N5031	S	N		2N5031	AH	0.2	A	10	0	0.02	25	1.0 m	1000 T			72/	20
★2N5032	S	N		2N5031	AH	0.2	A	10	0	0.02	25	1.0 m	1000 T			72/	20
2N5033				TABLE8	FET												
2N5034	S	N	2N5877	2N5875	AP	83	C	45	R	6.0	20	2.5 A					
2N5035	S	N	2N5877	2N5875	AP	83	C	45	R	6.0	20	3.0 A					
2N5036	S	N	2N5877	2N5875	AP	83	C	60	R	8.0	20	3.0 A					
2N5037	S	N	2N5877	2N5875	AP	83	C	60	R	8.0	20	3.0 A					
2N5038	S	N			SP	140	C	150	V	20	20	12 A	60 T		500/2000	3/	
2N5039	S	N			SP	140	C	120	V	20	20	10 A	60 T		500/2000	3/	
2N5040	S	P			A	0.3	A	25	0	1.0	30	150 m	100 T				
2N5041	S	P			A	0.3	A	40	0	1.0	40	150 m	80 T				
2N5042	S	P			A	0.8	A	40	0	1.0	40	150 m	100 T				
2N5043	G	P			A	0.03	A	7.0	0	0.03		3.0 m	1400 T			72/	
2N5044	G	P			A	0.03	A	7.0	0	0.03		3.0 m	1000 T			72/	
2N5045				TABLE8	FET												
THRU																	
2N5047				TABLE8	FET												
2N5048	S	N			SP	100	C	100	0	10	15	10 A	10 T		1000/3500	61/	
★2N5050	S	N		2N5050	AP	40	C	120	0	2.0	35	0.5 A	20 T	250	300/4700	66/	80
★2N5051	S	N		2N5050	AP	40	C	150	0	2.0	35	0.5 A	20 T	250	300/4700	66/	80
★2N5052	S	N		2N5050	AP	40	C	200	0		35	0.5 A	20 T	250	300/4700	66/	80
2N5053	S	N			AH	0.2	A	15	0	0.25	25	2.0 m	1300 T			72/	
2N5054	S	N			AH	0.2	A	15	0	0.25	25	2.0 m	1000 T			72/	
2N5055	S	P			SH	0.2	A	12	0	0.1	30	30 m	550 T		20/25	18/	
2N5056	S	P			SH	0.36	A	15	0	0.1	30	30 m	600 T		20/35	18/	
2N5057	S	P			SH	0.36	A	15	0	0.1	40	30 m	800 T		20/35	5/	
2N5058	S	N			A	1.0	C	300	0	0.15	35	30 m	30 T			5/	
2N5059	S	N			A	1.0	C	250	0	0.15	30	30 m	30 T				
2N5060				TABLE7	THY												
THRU																	
2N5064				TABLE7	THY												
2N5065	S	N			SH	2.5	C	15	0	0.5	50	300 m	550 T		15/35	46/	
2N5066	S	N			SC	0.4	A	20	0	0.1			5.0 T	10			
★2N5067	S	N		2N5067	AP	87.5	C	40	0	5.0	20	1.0 A	4.0 T			3/	11
★2N5068	S	N		2N5067	AP	87.5	C	60	0	5.0	20	1.0 A	4.0 T			3/	11
★2N5069	S	N		2N5067	AP	87.5	C	80	0	5.0	20	1.0 A	4.0 T			3/	11
★2N5070	S	N		2N5070	AHP	70	C	30	0	3.3	10	3.0 A	100 T	85		60/	36
2N5071	S	N			AHP	70	C	30	0	3.3	10	3.0 A	100 T	85		60/	
2N5072	S	N			AHP	125	C	100	R	10	15	3.0 A	40 T	600			
2N5073	S	N			AH	0.6	A	120	0	0.4	30	200 m	40 T	25		5/	31
2N5074	S	N			AP	70	C	200	0	3.0	30	0.5 A	40 T			59/	
2N5075	S	N			AP	70	C	200	0	3.0	90	0.5 A	40 T			59/	
2N5076	S	N			AP	70	C	250	0	3.0	30	0.5 A	40 T			59/	
2N5077	S	N			AP	70	C	250	0	3.0	90	0.5 A	40 T			59/	
2N5078				TABLE8	FET												
2N5079	S	N			A	1.8	C	30	0	1.0	100	150 m	400 T	7.0		18/	
2N5080	S	N			A	1.8	C	30	0	1.0	200	150 m	500 T	7.0		18/	
2N5081	S	N			AH	1.2	C	50	0		100	1.0 m	600 T			18/	
2N5082	S	N			AH	1.2	C	30	0		100	1.0 m	600 T			18/	
2N5083	S	N			SP	35	C	60	0	10	40	2.0 A	50 T			59/	
2N5084	S	N			SP	35	C	60	0	10	100	2.0 A	80 T			59/	
2N5085	S	N			SP	35	C	80	0	10	40	2.0 A	50 T			59/	
★2N5086	S	P		2N5086	A	0.31	A	50	0	0.05	150	0.1 m	40 T	4.0		92/	29
★2N5087	S	P		2N5086	A	0.31	A	50	0	0.05	250	0.1 m	40 T	4.0		92/	29
★2N5088	S	N		2N5088	A	0.31	A	30	0	0.05	300	0.1 m	50 T			92/	29
★2N5089	S	N		2N5088	A	0.31	A	25	0	0.05	400	0.1 m	50 T			92/	29
★2N5090	S	N		2N5090	AHP	4.0		30	0	0.4	10	50 m	500 T	3.5		60/	36
2N5091	S	P			A	2.0		300	0	1.0	40	25 m	20 T	20		5/	
2N5092	S	N			A	2.0		350	0	1.0	50	25 m	50 T	15		5/	
2N5093	S	P			A	2.0		350	0	1.0	40	25 m	20 T	20		5/	
2N5094	S	P			A	2.0		400	0	1.0	40	25 m	20 T	20		5/	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
											Min					
2N5095	S	N			A	2.0		400	0	1.0	50	25 m	50 T	15		5/
2N5096	S	P			A	2.0		450	0	1.0	40	25 m	20 T	20		5/
2N5097	S	N			A	2.0		450	0	1.0	50	25 m	50 T	15		5/
2N5098	S	N			A	2.0		500	0	1.0	50	25 m	50 T	15		5/
2N5099	S	N			A	2.0		550	0	1.0	50	25 m	50 T	15		5/
2N5100	S	P			A	10		400	0	1.0	40	25 m	20 T	20		
2N5101	S	N			A	10		400	0	1.0	50	25 m	50 T			
2N5102	S	N			AHP	70	C	50	R	3.3	10	500 m	150 T	85		60/
2N5103				TABLE8	FET											
THRU																
2N5105				TABLE8	FET											
2N5106	S	N			A	3.0	C	30	0	0.5	100	150 m	250 T		65/550	39/
2N5107	S	N			A	1.8	C	30	0	0.5	100	150 m	250 T		65/550	18/
★2N5108,A	S	N		2N5108	AHP	3.5	C	55	R	0.4			1200 T	3.0		39/79
★2N5109	S	N		2N5109	AHP	2.5	C	20	0	0.4	70	50 m	1200 T			39/79
2N5110	S	P			AP	5.0	C	40	0	1.0	15	500 m	1.0 T	500		5/
2N5111	S	P			AP	5.0	C	80	0	1.0	15	500 m	1.0 T	500		5/
2N5112	S	P			AP	34	C	40	0	1.0	15	500 m	1.0 T	500		59/
2N5113	S	P			AP	34	C	80	0	1.0	15	500 m	1.0 T	500		69/
2N5114				TABLE8	FET											
THRU																
2N5116				TABLE8	FET											
2N5117	S	P			AM	0.4	C	45	0	0.01	100	.010 m	100 T			78/
2N5118	S	P			AM	0.4	C	45	0	0.01	100	.010 m	100 T			78/
2N5119	S	P			AM	0.4	C	45	0	0.01	50	.010 m	100 T			78/
2N5120	S	P			AM	0.3	C	45	0	0.01	100	.010 m	100 T			71/
2N5121	S	P			AM	0.3	C	45	0	0.01	100	.010 m	100 T			71/
2N5122	S	P			AM	0.3	C	45	0	0.01	50	.010 m	100 T			71/
2N5123	S	P			AM	0.4	C	45	0	0.01	100	.010 m	100 T			
2N5124	S	P			AM	0.4	C	45	0	0.01	100	.010 m	100 T			
2N5125	S	P			AM	0.4	C	45	0	0.01	50	.010 m	100 T			
2N5126	S	N	MPS6539	MPS6539	A	0.2	A	20	0	0.03	20	4 m				106/
2N5127	S	N	MPS918	MPS918	A	0.2	A	12	0	0.1	15	2 m	150 T			106/
2N5128	S	N	2N5220	2N5220	A	0.2	A	12	0	0.5	35	50 m	200 T			105/
2N5129	S	N	2N5220	2N5220	A	0.3	A	12	0	0.5	35	50 m	200 T			106/
2N5130	S	N	MPS3563	MPS918	A	0.2	A	12	0	0.05	15	8 m	450 T			106/
2N5131	S	N	2N5223	2N5223	A	0.2	A	15	0	0.2	30	10 m				106/
2N5132	S	N	MPS6539	MPS6539	A	0.2	A	20	0	0.03	30	10 m				106/
2N5133	S	N	MPS2714	MPS2713	A	0.2	A	18	0	0.05	60	1.0 m				106/
2N5134	S	N	2N5224	2N5224	SH	0.2	A	10	0	0.1	20	10 m	250 T		18/18	106/
2N5135	S	N	2N5225	2N5225	A	0.3	A	25	0	0.2	50	10 m	40 T			105/
2N5136	S	N	MPS3706	MPS3704	A	0.22	A	20	0	0.5	20	150 m	40 T			105/
2N5137	S	N	MPS6560	MPS6560	A	0.3	A	20	0	0.5	20	150 m	40 T			106/
2N5138	S	P	MPS6516	MPS6512	A	0.2	A	30	0	0.1	50	100 *				106/
2N5139	S	P	MPS6516	MPS6512	SH	0.2	A	20	0	0.1	40	1.0 m	300 T		50/200	106/
2N5140	S	P	MPS6518	MPS6512	SH	0.2	A	5.0	0	0.05	20	10 m	400 T		20/20	106/
2N5141	S	P			SH	0.2	A	6	0	0.1	30	30 m	300 T		90/150	106/
2N5142	S	P			SH	0.3	A	20	0	0.5	30	50 m	100 T		100/200	105/
2N5143	S	P			SH	0.2	A	20	0	0.5	30	50 m	100 T		100/200	106/
2N5144	S	N			SH	1.2	C	30	0	0.5	60	100 m	300 T		25/40	18/
2N5145	S	N			SH	3.5	C	30	0	0.5	60	100 m	300 T		25/40	39/
★2N5146	S	P		2N5146	A	0.4	A	40	0	1.5	20	1.0 A	150 T			86/607
2N5147	S	P	2N6190	2N6190	AP	1.0	A	80	0	2.0	30	1.0 A	50 T			39/
2N5148	S	N	2N5336	2N5335	AP	1.0	A	80	0	2.0	30	1.0 A	50 T			39/
2N5149	S	P	2N6191	2N6190	AP	1.0	A	80	0	2.0	70	1.0 A	60 T			39/
2N5150	S	N	2N5337	2N5335	AP	1.0	A	80	0	2.0	70	1.0 A	60 T			39/
2N5151	S	P	2N6190	2N6190	AP	1.0	A	80	0	5.0	30	2.5 A	60 T			39/
2N5152	S	N	2N5336	2N5335	AP	1.0	A	80	0	2.0	30	2.5 A	60 T			39/
2N5153	S	P	2N6191	2N6190	AP	1.0	A	80	0	5.0	70	2.5 A	70 T			39/
2N5154	S	N	2N5337	2N5335	AP	1.0	A	80	0	2.0	70	2.5 A	70 T			39/
★2N5155	G	P		2N5155	SP			120	0	15	25	8.0 A	0.1 T			3/11
2N5156	G	P			SP	93	C	60	0	10	25	5.0 A	0.15 T		200/650	3/
★2N5157	G	P	2N5157	2N3902	SP	100	C	500	0	3.5	30	1.0 A	2.8 T	150	800/1700	
2N5158				TABLE8	FET											
2N5159				TABLE8	FET											
★2N5160	S	P		2N5160	AHP	5.0	C	40	0	0.4	10	50 m	500 T			39/79
★2N5161	S	P		2N5161	AHP	20	C	40	0	1.5	10	250 m				60/36
★2N5162	S	P		2N5161	AHP	50	C	40	0	5.0	10	2.0 A				60/36
2N5163				TABLE8	FET											
2N5164,R				TABLE7	THY											

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
THRU																
2N5171,R				TABLE7	THY											
2N5172	S	N			A	0.2	A	25	0	0.1	100	10 m				92/
2N5174	S	N			A	0.2	A	75	0	0.025	40	10 m				98/
2N5175	S	N			A	0.2	A	100	0	0.025	55	10 m				98/
2N5176	S	N			A	0.2	A	100	0	0.025	140	10 m				98/
2N5177	S	N			AHP	40	C	35	0	4.0	10	100 m	200 T	30		
2N5178	S	N			AHP	70	C	35	0	8.0	10	200 m	200 T	60		
★2N5179	S	N		2N5179	AH	0.2	A	12	0	0.05	25	3.0 m	900 T			72/20
2N5180	S	N			AH	0.18	A	15	0		20	2.0 m	650 T			104/
2N5181	S	N			AH	0.18	A	45	B	0.05	27	1.0 m	400 T			104/
2N5182	S	N			AH	0.18	A	35	B	0.4	27	1.0 m	400 T			104/
2N5183	S	N			AH	0.5	A	18	0	1.0	75	10 m	62.5 T			104/
2N5184	S	N			AH	0.5	A	120	0	0.05	10	50 m	50 T			104/
2N5185	S	N			AH	1.0	A	120	0	0.05	10	50 m	50 T			
2N5186	S	N			SH	0.3	A	5	S	0.3	25	10 m	400 T		25/25	52/
2N5187	S	N			SH	1.0	A	25	S	0.5	30	10 m	400 T		18/21	52/
2N5188	S	N			SH	0.8	A	55	S	1.0	25	150 m			35/50	39/
2N5189	S	N			SH	0.8	A	55	S	2.0	15	1.0 m			40/70	
★2N5190	S	N		2N5190	AP	40	C	40	0	4.0	25	1.5 A	2.0 T			/77
★2N5191	S	N		2N5190	AP	40	C	60	0	4.0	25	1.5 A	2.0 T			/77
★2N5192	S	N		2N5190	AP	40	C	80	0	4.0	20	1.5 A	2.0 T			/77
★2N5193	S	P		2N5193	AP	40	C	40	0	4.0	25	1.5 A	2.0 T			/77
★2N5194	S	P		2N5193	AP	40	C	60	0	4.0	25	1.5 A	2.0 T			/77
★2N5195	S	P		2N5193	AP	40	C	80	0	4.0	20	1.5 A	2.0 T			/77
2N5196				TABLE8	FET											
THRU																
2N5199				TABLE8	FET											
2N5200	S	N			A	1.2	C	20	0	0.1	50	10 m	900 T			46/
2N5201	S	N			A	1.2	C	20	0	0.1	75	10 m	1100 T			46/
2N5202	S	N	2N5427	2N5427	SP	35	C	75	V	4.0	10	4.0 A	60 T		400/1600	66/
2N5204				TABLE7	THY											
THRU																
2N5207				TABLE7	THY											
★2N5208	S	P		2N5208	AH	0.31	A	25	0	0.05	20	2.0 m	300 T			92/29
★2N5209	S	N		2N5209	A	0.31	A	50	0	0.05	100	0.1 m	30 T	4.0		92/29
★2N5210	S	N		2N5209	A	0.31	A	50	0	0.05	200	0.1 m	30 T	4.0		92/29
2N5211	S	N			AHP	3.0	C	80	0	0.6	10	0.2 A	200 T	12		37/
2N5212	S	N			AHP	7.5	C	80	0	0.6	10	0.2 A	200 T	12		37/
2N5213	S	N			AHP	7.5	C	40	0	0.5	10	0.2 A	350 T	15		37/
2N5214	S	N			AHP	60	C	95	S	5.0	10	1.0 A	150 T	100		
2N5215	S	N			AHP	23	C	70	0	1.0	10	0.5 A	400 T	25		60/
2N5216	S	N			AHP	25	C	80	0	1.5	10	0.5 A	350 T	30		
2N5217	S	N			AHP	7.5	C	80	0	0.5	10	0.2 A	350 T	12		
2N5218	S	N			AP	50	C	200	0	10	15	5.0 A	40 T	200	600/5500	61/
★2N5219	S	N		2N5219	A	0.31	A	15	0	0.1	35	2.0 m	150 T			92/29
★2N5220	S	N		2N5220	A	0.31	A	15	0	0.5	30	50 m	100 T			92/29
★2N5221	S	P		2N5221	A	0.31	A	15	0	0.5	30	50 m	100 T			92/29
★2N5222	S	N		2N5222	A	0.31	A	15	0	0.05	20	4.0 m	450 T			92/29
★2N5223	S	N		2N5223	A	0.31	A	20	0	0.1	50	2.0 m	150 T			92/29
★2N5224	S	N		2N5224	SH	0.31	A	12	0	0.1	40	10 m	250 T			92/29
★2N5225	S	N		2N5225	A	0.31	A	25	0	0.5	30	50 m	50 T			92/29
★2N5226	S	P		2N5226	A	0.31	A	25	0	0.5	30	50 m	50 T			92/29
★2N5227	S	P		2N5227	A	0.31	A	30	0	0.05	50	2.0 m	100 T			92/29
★2N5228	S	P		2N5228	SH	0.31	A	5	0	0.05	30	10 m	300 T			92/29
★2N5229	S	P		2N5229	SC	2.0	C	10	0	0.05	50	100 *				46/26
★2N5230	S	P		2N5229	SC	2.0	C	20	0	0.05	50	100 *				46/26
★2N5231	S	P		2N5229	SC	2.0	C	30	0	0.05	50	100 *				46/26
2N5232	S	N			A	0.33	A	50	0	0.1	250	2.0 m				98/
2N5233	S	N			A	0.33	A	60	0	0.1	100	10 m				98/
2N5234	S	N			A	0.33	A	60	0	0.1	250	10 m				98/
2N5235	S	N			A	0.33	A	60	0	0.1	400	10 m				98/
2N5236	S	N			AH	1.0	C	20	0	0.15	30	50 m	500 T			39/
2N5237	S	N	2N5337	2N5335	SP	5.0	C	120	0	5.0	40	5.0 A	25 T		500/2000	5/
2N5238	S	N			SP	5.0	C	170	0	5.0	40	5.0 A	25 T		500/2000	5/
2N5239	S	N			AP	100	C	225	0	5.0	20	2.0 A	5.0 T			3/
2N5240	S	N			AP	100	C	300	0	5.0	20	2.0 A	5.0 T			3/
★2N5241	S	N		2N5241	SP	125	C	400	0	5.0	15	2.5 A	2.5 T		800/1700	3/11
2N5242	S	P			SH	0.5	A	20	0	0.5	25	500 m	170 T		40/90	105/
2N5243	S	P			SH	0.5	A	30	0	0.5	25	500 m	170 T		40/90	105/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	PACKAGE Case No.
2N5244	S	P			SH	1.0	C	40	0	0.1	150	10 m			40/200	18	
2N5245				TABLE8	FET												
THRU																	
2N5248				TABLE8	FET												
2N5249	S	N			A	0.33	A	50	0	0.1	400	2.0 m				98	
2N5249A	S	N			A	0.33	A	50	0	0.1	400	2.0 m				98	
2N5250	S	N			SP	350	C	100	0	90	10	70 A	10 T		2000/2000		
2N5251	S	N			SP	350	C	150	0	90	10	70 A	10 T		2000/2000		
2N5252	S	N			A	7.0	C	300	0	1.0	40	100 m	30 T			39	
2N5253	S	N			A	7.0	C	300	0	1.0	80	100 m	30 T			39	
2N5254	S	P			AL	0.8	C	40	0	0.05	50	0.1 m	40 T				
2N5255	S	P			AM	0.8	C	40	0	0.05	150	.10 m	40 T				
2N5256	S	P			AM	0.8	C	40	0	0.05	150	.10 m	40 T				
2N5257				TABLE7	THY												
THRU																	
2N5261				TABLE7	THY												
2N5262	S	N	2N6187	2N6182	SH	4.0	C	50	0	2.0	35	100 m			30/60		
2N5264	S	N	2N6189	2N6182	SP	87	C	180	0	10	30	1.0 A	50 T		1500/4000	3	
2N5265				TABLE8	FET												
THRU																	
2N5270				TABLE8	FET												
★2N5271	S	N		2N5271	SH	0.6	A			5.0					5.0/1.0	39	79
2N5272	S	N			SH	0.36	A	20	0	0.2	100	10 m	500 T		12/18	18	
2N5273				TABLE7	THY												
THRU																	
2N5275				TABLE7	THY												
2N5276	S	N			S	0.36	A	15	0	0.1	30	1.0 m	600 T		20/86	18	
2N5277				TABLE8	FET												
2N5278				TABLE8	FET												
2N5279	S	N			AH	5.0	C	300	0	1.0	40	20 m	15 T	10		5	
2N5280	S	N			AH	15	C	300	0	1.0	40	20 m	15 T	10			
2N5281	S	P			A	200	C	150	0	1.0	20	1.0 m	20 T	20		5	
2N5282	S	P			A	200	C	300	0	1.0	20	1.0 m	20 T	20			
2N5284	S	N	2N5346	2N5346	AP	50	C	80	0	5.0	30	2.5 A	60 T			59	
2N5285	S	N	2N5347	2N5346	AP	50	C	80	0	5.0	70	2.5 A	70 T			59	
2N5286	S	P	2N6188	2N6186	AP	50	C	100	0	5.0	30	2.5 A	60 T			59	
2N5287	S	P			AP	50	C	100	0	5.0	70	2.5 A	70 T			59	
2N5288	S	N	2N5349	2N5346	AP	100	C	100	0	10	30	5.0 A	30 T				
2N5289	S	N			AP	100	C	100	0	10	70	5.0 A	40 T				
2N5290	S	P			AP	100	C	100	0	10	30	5.0 A	30 T				
2N5291	S	P			AP	100	C	100	0	10	70	5.0 A	40 T				
2N5292	S	P			SH	1.0	C	12	S	0.1	40	30 m	800 T		15/35	18	
2N5293	S	N	2N4922	2N4921	AP	36	C	75	R	4.0	30	0.5 A	8.0 T			220AA	
2N5294	S	N	2N4922	2N4921	AP	36	C	75	R	4.0	30	0.5 A	8.0 T			220AB	
2N5295	S	N	2N5190	2N5190	AP	36	C	50	R	4.0	30	1.0 A	8.0 T			220AA	
2N5296	S	N	2N5190	2N5190	AP	36	C	50	R	4.0	30	1.0 A	8.0 T			220AB	
2N5297	S	N	2N4233	2N4231	AP	36	C	70	R	4.0	20	1.5 A	8.0 T			220AA	
2N5298	S	N	2N4233	2N4231	AP	36	C	70	R	4.0	20	1.5 A	8.0 T			220AB	
★2N5301	S	N		2N5301	AP	200	C	40	0	30	15	15 A	2.0 T		100/300		12
★2N5302	S	N	2N5303	2N5301	AP	200	C	60	0	30	15	15 A	2.0 T		100/300		12
★2N5303	S	N		2N5301	AP	200	C	80	0	20	15	10 A	2.0 T		100/300		12
★2N5304	S	N		2N5304	AP	25	C	40	0	10	30	2.0 A	10 T	300		61	9
2N5305	S	N			AL	0.45	A	25	0	0.2	2k	2.0 m	60 T			98	
2N5306	S	N			AL	0.4	A	25	0	0.2	7k	2.0 m	60 T			98	
2N5306A	S	N			A	0.4	A	25	0	0.3	7k	2.0 m	60 T			98	
2N5307	S	N			AL	0.4	A	40	0	0.2	2k	2.0 m	60 T			98	
2N5308	S	N			AL	0.4	A	40	0	0.2	7k	2.0 m	60 T			98	
2N5308A	S	N			A	0.4	A	40	0	0.3	7k	2.0 m	60 T			98	
2N5309	S	N			A	0.33	A	50	0	0.1	60	10 *				98	
2N5310	S	N			A	0.33	A	50	0	0.1	100	10 *				98	
2N5311	S	N			A	0.33	A	50	0	0.1	250	10 *				98	
2N5312	S	P			AP	50	C	80	0	10	30	10 A	30 T	500	500/1250	61	
2N5313	S	N			AP	50	C	80	0	10	30	10 A	30 T	500	500/1500	61	
2N5314	S	P			AP	50	C	100	0	10	30	10 A	30 T	500	500/1250	61	
2N5315	S	N			AP	50	C	100	0	10	30	10 A	30 T	500	500/1500	61	
2N5316	S	P			AP	50	C	80	0	10	30	5.0 A	30 T	500	200/1200	61	
2N5317	S	N			AP	50	C	80	0	10	30	5.0 A	30 T	500	400/1600	61	
2N5318	S	P			AP	50	C	100	0	10	30	5.0 A	30 T	500	200/1200	61	
2N5319	S	N			AP	50	C	100	0	10	30	5.0 A	30 T	500	400/1600	61	
2N5320	S	N			SP	10	C	75	0	2.0	30	500 m	50 T		80/800	5	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
2N5321	S	N			SP	10	C	50	0	2.0	40	500 m	50 T		80/800	5/
2N5322	S	P	2N6190	2N6190	SP	10	C	75	0	2.0	30	500 m	50 T		100/1000	5/
2N5323	S	P	2N6190	2N6190	SP	10	C	50	0	2.0	40	500 m	50 T		100/1000	5/
★2N5324	G	P		2N5324	SP	56	C	150	0	10	20	5.0 A	2.0 T		150/170	3/11
★2N5325	G	P		2N5324	SP	56	C	200	0	10	20	5.0 A	2.0 T		150/170	3/11
2N5326	S	N	2N5347	2N5346	SP	20	C	80	0	5.0	50	1.0 A	80 T		150/400	59/
2N5327	S	N			SP	5.0	C	80	0	10	100	1.0 A	100 T		200/900	5/
2N5328	S	N			SP	30	C	80	0	10	100	1.0 A	100 T		200/900	59/
2N5329	S	N			SP	65	C	90	0	20	40	10 A	80 T		350/1100	61/
2N5330	S	N	MJ7000	MJ7000	SP	80	C	90	0	30	40	10 A	80 T		350/1250	61/
2N5331	S	N	MJ7000	MJ7000	SP	100	C	90	0	30	40	10 A	80 T		350/1250	63/
2N5332	S	P			SH	0.36	A	12	0	0.1	20	1.0 m	600 T		20/86	46/
2N5333	S	P	2N3868		AP	1.0	A	80	0	2.0	30	1.0 A	30 T			5/
★2N5334	S	N		2N5334	SP	6.0	C	60	0	3.0	30	1.0 A	40 T	75	50/1050	39/79
★2N5335	S	N		2N5334	SP	6.0	C	80	0	3.0	30	1.0 A	40 T	75	50/1050	39/79
★2N5336	S	N		2N5336	SP	6.0	C	80	0	5.0	30	2.0 A	30 T	250	200/400	39/79
★2N5337	S	N		2N5336	SP	6.0	C	80	0	5.0	60	2.0 A	30 T	250	200/400	39/79
★2N5338	S	N		2N5336	SP	6.0	C	100	0	5.0	30	2.0 A	30 T	250	200/400	39/79
★2N5339	S	N		2N5336	SP	6.0	C	100	0	5.0	60	2.0 A	30 T	250	200/400	39/79
★2N5344	S	P		2N5344	SP	40	C	250	0	1.0	25	500 m	60 T	200	100/700	66/80
★2N5345	S	P		2N5344	SP	40	C	300	0	1.0	25	500 m	60 T	200	100/700	66/80
★2N5346	S	N		2N5346	SP	60	C	80	0	7.0	30	2.0 A	30 T	250		59/160
★2N5347	S	N		2N5346	SP	60	C	80	0	7.0	30	2.0 A	30 T	250		59/160
★2N5348	S	N		2N5346	SP	60	C	100	0	7.0	60	2.0 A	30 T	250		59/160
★2N5349	S	N		2N5346	SP	60	C	100	0	7.0	60	2.0 A	30 T	250		59/160
2N5350	S	N			SP	350	C	100	0	90	10	70 A	10 T		2k/12k	
2N5351	S	N			SP	350	C	150	0	90	10	70 A	10 T		2k/12k	
2N5354	S	P			A	0.36	A	25	0	0.5	40	50 m				98/
2N5355	S	P			A	0.36	A	25	0	0.5	100	50 m				98/
2N5356	S	P			A	0.36	A	25	0	0.5	250	50 m				98/
2N5357	S	P	2N5345	2N5357	SP	30	C	300	0	3.0	25	500 m	50 T	60	150/700	37/39
2N5358				TABLE8	FET											
THRU																
2N5364				TABLE8	FET											
2N5365	S	P			A	0.36	A	40	0	0.5	40	50 m				98/
2N5366	S	P			A	0.36	A	40	0	0.5	100	50 m				98/
2N5367	S	P			A	0.36	A	40	0	0.5	250	50 m				98/
2N5368	S	N			A	0.36	A	30	0	0.5	60	150 m	250 T		40/350	
2N5369	S	N			A	0.36	A	30	0	0.5	100	150 m	250 T		40/350	
2N5370	S	N			A	0.36	A	30	0	0.5	200	150 m	250 T		40/400	
2N5371	S	N			A	0.36	A	30	0	0.5	60	150 m	250 T		40/400	
2N5372	S	P			A	0.36	A	30	0	0.5	40	150 m	150 T		50/150	
2N5373	S	P			A	0.36	A	30	0	0.5	100	150 m	150 T		50/150	
2N5374	S	P			A	0.36	A	30	0	0.5	200	150 m	150 T		50/175	
2N5375	S	P			A	0.36	A	30	0	0.5	40	150 m	150 T		50/175	
2N5376	S	N			A	0.36	A	30	0	0.5	100	.01 m	300 T			
2N5377	S	N			A	0.36	A	30	0	0.5	40	.01 m	300 T			
2N5378	S	P			A	0.36	A	30	0	0.5	100	.01 m	200 T			
2N5379	S	P			A	0.36	A	30	0	0.5	40	.01 m	200 T			
2N5380	S	P			AP	0.36	A	40	0		50	10 m	250 T		70/225	
2N5381	S	P			AP	0.36	A	40	0		100	10 m	300 T		70/250	
2N5382	S	P			AP	0.36	A	40	0		150	10 m	200 T		70/260	
2N5383	S	N			AP	0.36	A	40	0		100	10 m	250 T		70/300	
2N5384	S	P	2N6186	2N6182	A	2.0	A	80	0	5.0	20	2.0 A	30 T			111/
2N5385	S	P	2N6186	2N6182	A	2.0	A	80	0	5.0	20	2.0 A	30 T			111/
2N5386	S	P	2N3490	2N3487	A	3.5	A	80	0	12	20	6.0 A	30 T			61/9
2N5387	S	N			A	3.5	A	200	0	7.5	25	2.0 A	15 T			61/9
2N5388	S	N			A	3.5	A	250	0	7.5	25	2.0 A	15 T			61/9
2N5389	S	N			A	3.5	A	300	0	7.5	25	2.0 A	15 T			61/9
2N5390	S	N			AL	1.0	C	80	0	2.0	2k	2.0 A	40 T	100		33/
2N5391				TABLE8	FET											
THRU																
2N5398																
2N5399	S	N			SH	0.36	A	15	0	0.1	30	1.0 m	600 T		20/86	46/26
★2N5400	S	P		2N5400	A	0.31	A	120	0	0.6	40	10 m	100 T	6.0		92/29
★2N5401	S	P		2N5400	A	0.31	A	150	0	0.6	60	10 m	100 T	6.0		92/29
2N5404	S	P	2N6190	2N6190	AP	1.0	A	80	0	5.0	20	2.0 A	40 T	150	500/950	5/31
2N5405	S	P	2N6192	2N6190	AP	1.0	A	100	0	5.0	20	2.0 A	40 T	150	500/950	5/31
2N5406	S	P	2N6191	2N6190	AP	1.0	A	80	0	5.0	40	2.0 A	40 T	150	500/1300	5/31
2N5407	S	P	2N6193	2N6190	AP	1.0	A	100	0	5.0	40	2.0 A	40 T	150	500/1300	5/31

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No.	PACKAGE Case No.
2N5408	S	P	2N6186	2N6182	AP	30	C	80	0	5.0	20	2.0 A	40 T	150	500/950	111	
2N5409	S	P	2N6188	2N6182	AP	30	C	100	0	5.0	20	2.0 A	40 T	150	500/950	111	
2N5410	S	P	2N6187	2N6182	AP	30	C	80	0	5.0	40	2.0 A	40 T	150	500/1300	111	
2N5411	S	P	2N6189	2N6182	AP	30	C	100	0	5.0	40	2.0 A	40 T	150	500/1300	111	
2N5412	S	N			AP	100	C	60	0	15	10	2.0 A	60 T		225/600	61	9
2N5413	S	N			SH	1.0	A	40	0	2.0	25	2.0 A	250 T		40/60	39	79
2N5414	S	N			SH	1.0	A	50	0	2.0	25	2.0 A	250 T		40/70	39	79
2N5415	S	P			AH	10	C	200	0	1.0	30	50 m	15 T	15		5	31
2N5416	S	P			AH	10	C	300	0	1.0	30	50 m	15 T	15		5	31
2N5417	S	N			SH	0.5	A	35	0	0.5	80	150 m	250 T		26/210	39	79
2N5418	S	N			A	0.36	A	25	0	0.5	40	50 m				98	
2N5419	S	N			A	0.36	A	25	0	0.5	100	50 m				98	
2N5420	S	N			A	0.36	A	25	0	0.5	250	50 m				98	
2N5421	S	N			AHP	3.0	C	18	0	0.5	10	0.1 A	300 T	5.0		39	79
2N5422	S	N			AHP	5.0	C	18	0	1.0	10	0.5 A	300 T	15		39	79
2N5423	S	N			AHP	12	C	18	0	2.0	20	1.0 A	300 T	25		60	36
2N5424	S	N			AHP	20	C	18	0	4.0	20	2.0 A	250 T	45		60	36
2N5424A	S	N			AH	20	C	18	0	4.0	20	2.0 A	250 T	45		60	36
2N5425	S	N			AH	20	C	60	0	5.0	500	5.0 A	50 T		300/2000		
2N5426	S	N			AH	20	C	60	0	5.0	1000	5.0 A	50 T		300/2000		
★2N5427	S	N		2N5427	SP	40	C	80	0	7.0	30	2.0 A	30 T	250	200/400	66	80
★2N5428	S	N		2N5427	SP	40	C	80	0	7.0	60	2.0 A	30 T	250	200/400	66	80
★2N5429	S	N		2N5427	SP	40	C	100	0	7.0	30	2.0 A	30 T	250	200/400	66	80
★2N5430	S	N		2N5427	SP	40	C	100	0	7.0	60	2.0 A	30 T	250	200/400	66	80
2N5431				TABLE10	UJT												
2N5432				TABLE10	UJT												
2N5433				TABLE8	FET												
2N5434				TABLE8	FET												
★2N5435	G	P		2N5435	SP	120	C	60	0	60	20	25 A			1200/2200	3	3
★2N5436	G	P		2N5435	SP	120	C	90	0	60	20	25 A			1200/2200	3	3
★2N5437	G	P		2N5435	SP	120	C	120	0	60	20	25 A			1200/2200	3	3
★2N5438	G	P		2N5435	SP	120	C	60	0	60	40	25 A			1200/2200	3	3
★2N5439	G	P		2N5435	SP	120	C	90	0	60	40	25 A			1200/2200	3	3
★2N5440	G	P		2N5435	SP	120	C	120	0	60	40	25 A			1200/2200	3	3
2N5441 THRU 2N5446																	
2N5447	S	N			A	0.36	A	25	0	0.2	60	50 m	100 T				
2N5448	S	N			A	0.36	A	30	0	0.2	30	50 m	100 T				
2N5449	S	N			A	0.36	A	30	0	0.8	100	50 m	100 T				
2N5450	S	N			A	0.36	A	30	0	0.8	50	50 m	100 T				
2N5451	S	N			A	0.36	A	20	0	0.8	30	50 m	100 T				
2N5452 THRU 2N5454				TABLE8	FET												
2N5455	S	P			SH	0.34	A	15	0	0.3	30	30 m	450 T		20/30	52	
2N5456	S	P			SH	0.34	A	25	0	0.3	30	30 m	450 T		20/30	52	
2N5457 THRU 2N5465				TABLE8	FET												
2N5466	S	N	MJ431		AP	40	C	400	0	3.0	15	3.0 A	2.5 T	200		3	
2N5467	S	N	MJ431		AP	40	C	400	0	3.0	15	3.0 A	2.5 T	200		3	
2N5468	S	N	MJ431		AP	40	C	400	0	3.0	15	3.0 A	2.5 T	200		66	
2N5469	S	N	MJ431		AP	40	C	400	0	3.0	15	3.0 A	2.5 T	200		66	
2N5470	S	N			AH	3.5	C	55	R	0.2							
2N5471 THRU 2N5476				TABLE8	FET												
★2N5477	S	N		2N5477	SP	60	C	80	0	7.0	30	2.0 A	30 T	250	200/400	59	160
★2N5478	S	N		2N5477	SP	60	C	80	0	7.0	60	2.0 A	30 T	250	200/400	59	160
★2N5479	S	N		2N5477	SP	60	C	100	0	7.0	30	2.0 A	30 T	250	200/400	59	160
★2N5480	S	N		2N5477	SP	60	C	100	0	7.0	60	2.0 A	30 T	250	200/400	59	160
2N5481	S	N			AHP	5.0	C	30	0	0.2	20	50 m					
2N5482	S	N			AHP	10	C	30	0	0.35	20	50 m					
2N5483	S	N			AHP	20	C	30	0	0.7	20	100 m		10			
2N5484 THRU 2N5486				TABLE8	FET												
2N5487	S	N			SP	15	C	80	0	5.0	100	1.0 A	40 T	75	125/450		
2N5488	S	N			SP	15	C	100	0	5.0	40	1.0 A	40 T	75	125/550		

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N5489	S	N	MJ7201	MJ7200	AP	300	C	100	0	.40	15	40 A	0.5 T			114/
2N5490	S	N	2N5873	2N5871	AP	50	C	50	R	7.0	20	2.0 A	0.8 T			
2N5491	S	N	2N5873	2N5871	AP	50	C	50	R	7.0	20	2.0 A	0.8 T			
2N5492	S	N	2N5873	2N5871	AP	50	C	65	R	7.0	20	2.0 A	0.8 T			
2N5493	S	N	2N5873	2N5871	AP	50	C	65	R	7.0	20	2.0 A	0.8 T			
2N5494	S	N	2N5877	2N5875	AP	50	C	50	R	7.0	20	2.0 A	0.8 T			
2N5495	S	N	2N5877	2N5875	AP	50	C	50	R	7.0	20	2.0 A	0.8 T			
2N5496	S	N	2N5878	2N5875	AP	50	C	80	R	7.0	20	2.0 A	0.8 T			
2N5497	S	N	2N5878	2N5875	AP	50	C	80	R	7.0	20	2.0 A	0.8 T			
2N5498	S	N	2N5631	2N5629	AP	200	C	130	0	15	10	15 A	1.0 T			
2N5505				TABLE8	FET											
THRU																
2N5514				TABLE8	FET											
2N5515				TABLE8	FET											
THRU																
2N5524				TABLE8	FET											
2N5525	S	N			AL	0.36	A	30	0	0.2	5000	10 m	200 T	10		
2N5526	S	N			AL	0.36	A	30	0	0.2	1000	10 m	200 T	10		
2N5527	S	N			AP	5.0	C	40	0	5.0	40	3.0 A	200 T	75		
2N5528	S	N			AP	35	C	40	0	10	40	3.0 A	200 T	75		59/
2N5529	S	N			AP	35	C	40	0	10	40	3.0 A	200 T	75		61/
2N5530	S	N			AP	35	C	40	0	10	40	3.0 A	200 T	75		61/
2N5531	S	N			AP	5.0	C	75	0	5.0	30	3.0 A	200 T	75		
2N5532	S	N			AP	35	C	75	0	10	30	3.0 A	200 T	75		59/
2N5533	S	N			AP	35	C	75	0	10	30	3.0 A	200 T	75		61/
2N5534	S	N			AP	35	C	75	0	10	30	3.0 A	200 T	75		61/
2N5535	S	N			AP	50	C	50	0	20	30	10 A	150 T	100	225/600	
2N5536	S	N			AP	50	C	50	0	20	30	10 A	150 T	100	225/600	
2N5537	S	N			AP	50	C	75	0	20	20	10 A	150 T	100	225/600	61/
2N5538	S	N			AP	50	C	75	0	20	20	10 A	150 T	100	225/600	61/
2N5539	S	N	MJ7000	MJ7000	SP	100		130	0	20	25	10 A	20 T		500/2000	63/
2N5540	S	N			SP	50		300	0	10	20	5.0 A	20 T		1500/3000	61/
2N5541	S	N			SP	5.0		130	0	5.0	30	5.0 A	20 T		500/2000	5/
2N5542	S	N			SP	50		130	0	10	30	5.0 A	20 T		500/2000	61/
2N5543				TABLE8	FET											
THRU																
2N5549				TABLE8	FET											
★2N5550	S	N		2N5550	A	0.31	A	140	0	0.6	60	10 m	100 T	6.0		92/29
★2N5551	S	N		2N5550	A	0.31	A	160	0	0.6	80	10 m	100 T	6.0		92/29
2N5552	S	N			SP	15	C	80	0	10	50	5.0 A	30 T	150	100/700	
2N5555				TABLE8	FET											
THRU																
2N5558				TABLE8	FET											
2N5559	S	N	2N5633	2N5632	SP	100	C	120	X	10	20	4.0 A	0.8 T		600/800	3/
2N5560	S	N			SP	150	C	120	X	30	30	15 A	40 T		1000/2000	63/
2N5561				TABLE8	FET											
THRU																
2N5566				TABLE8	FET											
2N5567				TABLE7	THY											
THRU																
2N5574				TABLE7	THY											
2N5575	S	N		-	SP	150	C	70	X	80	10	60 A	0.4 T		150/150	
2N5576	S	N			SP	150	C	70	X	80	10	60 A	0.4 T		150/150	
2N5577	S	N			SP	150	C	70	X	80	10	60 A	0.4 T		150/150	
2N5578	S	N			SP	150	C	90	X	60	10	40 A	0.4 T		100/100	
2N5579	S	N			SP	150	C	90	X	60	10	40 A	0.4 T		100/100	
2N5580	S	N			SP	150	C	90	X	60	10	40 A	0.4 T		100/100	
★2N5581	S	N		2N5581	SH	2.0	C	40	0	0.8	40	150 m	250 T	8.0	35/285	46/26
★2N5582	S	N		2N5581	SH	2.0	C	40	0	0.8	100	150 m	300 T	8.0	35/285	46/26
★2N5583	S	N		2N5583	SH	5.0	C	30	0	0.5	25	100 m	1300 T			39/79
2N5584	S	N			SP	100	C	180	0	30	40	10 A	70 T		350/1250	63/188
2N5587	S	N			AP	300	C	120	0	80	10	80 A	0.5 T			114/
2N5588	S	N			AP	300	C	160	0	80	10	80 A	0.5 T			114/
2N5589	S	N		2N5589	AP	15	C	18	0	0.6	5.0	100 m	200 T	30		/144
★2N5590	S	N		2N5590	AP	30	C	18	0	2.0	5.0	250 m	200 T	70		/145
★2N5591	S	N		2N5591	AP	70	C	18	0	4.0	5.0	200 m	200 T	120		/145
2N5592				TABLE8	FET											
THRU																
2N5594				TABLE8	FET											
2N5595	S	N			AP	30	C	30	0	1.25	20	50 m	1500 T	8.0		

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N5596	S	N			AP	40	C	30	0	2.5	20	50 m	1500 T	30		
2N5597	S	P			AP	20	C	60	0	2.0	70	1.0 A	60 T			66/
2N5598	S	N	2N5428	2N5427	AP	20	C	60	0	2.0	70	1.0 A	60 T			66/
2N5599	S	P			AP	20	C	80	0	2.0	30	1.0 A	50 T			66/
2N5600	S	N	2N5427	2N5427	AP	20	C	80	0	2.0	30	1.0 A	50 T			66/
2N5601	S	P	2N5344	2N5344	AP	20	C	80	0	2.0	70	1.0 A	60 T			66/
2N5602	S	N	2N5428	2N5427	AP	20	C	80	0	2.0	70	1.0 A	60 T			66/
2N5603	S	P	2N5344	2N5344	AP	20	C	100	0	2.0	30	1.0 A	50 T			66/
2N5604	S	N	2N5428	2N5427	AP	20	C	100	0	2.0	30	1.0 A	50 T			66/
2N5605	S	P	2N5428	2N5427	AP	25	C	60	0	5.0	70	2.5 A	70 T			66/
2N5606	S	N	2N5428	2N5427	AP	25	C	60	0	5.0	70	2.5 A	70 T			66/
2N5607	S	P			AP	25	C	80	0	5.0	30	2.5 A	60 T			66/
2N5608	S	N	2N5477	2N5477	AP	25	C	80	0	5.0	30	2.5 A	60 T			66/
2N5609	S	P			AP	25	C	80	0	5.0	70	2.5 A	70 T			66/
2N5610	S	N	2N5428	2N5427	AP	25	C	80	0	5.0	70	2.5 A	70 T			66/
2N5611	S	P			AP	25	C	100	0	5.0	30	2.5 A	60 T			66/
2N5612	S	N	2N5429	2N5427	AP	25	C	100	0	5.0	30	2.5 A	60 T			66/
2N5613	S	P			AP	50	C	60	0	5.0	70	2.5 A	70 T			3/
2N5614	S	N			AP	50	C	60	0	5.0	70	2.5 A	70 T			3/
2N5615	S	P	2N5876	2N5875	AP	50	C	80	0	5.0	30	2.5 A	60 T			3/
2N5616	S	N	2N5878	2N5875	AP	50	C	80	0	5.0	30	2.5 A	60 T			3/
2N5617	S	P			AP	50	C	80	0	5.0	70	2.5 A	70 T			3/
2N5618	S	N			AP	50	C	80	0	5.0	70	2.5 A	70 T			3/
2N5619	S	P	2N6229	2N6229	AP	50	C	100	0	5.0	30	2.5 A	60 T			3/
2N5620	S	N	2N5632	2N5632	AP	50	C	100	0	5.0	30	2.5 A	60 T			3/
2N5621	S	P			AP	100	C	60	0	10	70	5.0 A	40 T			3/
2N5622	S	N			AP	100	C	60	0	10	70	5.0 A	40 T			3/
2N5623	S	P	2N5880	2N5879	AP	100	C	80	0	10	30	5.0 A	30 T			3/
2N5624	S	N	2N5882	2N5879	AP	100	C	80	0	10	30	5.0 A	30 T			3/
2N5625	S	P			AP	100	C	80	0	10	70	5.0 A	40 T			3/
2N5626	S	N			AP	100	C	80	0	10	70	5.0 A	40 T			3/
2N5627	S	P	2N6229	2N6229	AP	100	C	100	0	10	30	5.0 A	30 T			3/
2N5628	S	N	2N5632	2N5632	AP	100	C	100	0	10	30	5.0 A	30 T			3/
★2N5629	S	N		2N5629	AP	200	C	100	0	16	25	8.0 A	1.0 T	500		3/11
★2N5630	S	N		2N5629	AP	200	C	120	0	16	20	8.0 A	1.0 T	500		3/11
★2N5631	S	N		2N5629	AP	200	C	140	0	16	15	8.0 A	1.0 T	500		3/11
★2N5632	S	N		2N5632	AP	150	C	100	0	10	25	5.0 A	1.0 T	300		3/11
★2N5633	S	N		2N5632	AP	150	C	120	0	10	20	5.0 A	1.0 T	300		3/11
★2N5634	S	N		2N5632	AP	150	C	140	0	10	15	5.0 A	1.0 T	300		3/11
★2N5635	S	N		2N5635	A	7.5	C	35	0	1.0	5.0	100 m	500 T	10		/144
★2N5636	S	N		2N5635	A	15	C	35	0	1.5	5.0	200 m	450 T	20		/144
★2N5637	S	N		2N5635	A	30	C	35	0	3.0	5.0	500 m	400 T	30		/145
2N5638				TABLE8	FET											
THRU																
2N5640				TABLE8	FET											
★2N5641	S	N		2N5641	A	15	C	35	0	1.0	5.0	100 m	300 T	15		/144
★2N5642	S	N		2N5641	A	30	C	35	0	3.0	5.0	200 m	250 T	35		/145
★2N5643	S	N		2N5641	A	60	C	35	0	5.0	5.0	200 m	200 T	65		/145
★2N5644	S	N		2N5644	AP	3.5	C	18	0	0.25	15	100 m	400 T	8.0		/145
★2N5645	S	N		2N5645	AP	12	C	18	0	1.0	15	500 m	400 T	20		/145
★2N5646	S	N		2N5646	AP	30	C	18	0	2.0	15	1.0 A	400 T	40		/145
2N5647				TABLE8	FET											
THRU																
2N5649				TABLE8	FET											
2N5650	S	N			AH	0.15	A	15	0	0.03	30	3.0 m	2000 T			72/
2N5651	S	N			AH	0.15	A	15	0	0.03	30	3.0 m	2000 T			72/
2N5652	S	N			AH	0.15	A	15	0	0.03	30	3.0 m	2000 T			72/
2N5653				TABLE8	FET											
2N5654				TABLE8	FET											
★2N5655	S	N	2N3739	2N3738	AP	20	C	250	0	0.5	30	100 m	10 T	25		/77
★2N5656	S	N	2N3739	2N3738	AP	20	C	300	0	0.5	30	100 m	10 T	25		/77
★2N5657	S	N	2N3739	2N3738	AP	20	C	350	0	0.5	30	100 m	10 T	25		/77
2N5658	S	N			SP	30	C	80	0	10	50	5.0 A	30 T	150	1500/800	59/160
2N5659	S	N			SP	30	C	80	0	10	50	5.0 A	30 T	150	1500/800	111/
2N5660	S	N	2N6233	2N6233	SP	20	C	200	0	1.0	40	500 m	20 T	60	250/850	66/
2N5661	S	N	2N6234	2N6233	SP	20	C	300	0	1.0	40	500 m	20 T	60	250/1200	66/
2N5662	S	N			SP	15	C	200	0	1.0	40	500 m	20 T	60	250/850	5/
2N5663	S	N			SP	15	C	300	0	1.0	40	500 m	20 T	60	250/1200	5/
2N5664	S	N	2N6233	2N6233	SP	30	C	200	0	3.0	40	1.0 A	20 T	125	250/1500	66/
2N5665	S	N	2N6234	2N6233	SP	30	C	300	0	3.0	40	1.0 A	20 T	125	250/2000	66/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N5666	S	N			SP	15	C	200	0	3.0	40	1.0 A	20 T	125	250/1500	5/
2N5667	S	N			SP	15	C	300	0	3.0	40	1.0 A	20 T	125	250/2000	5/
2N5668				TABLE8	FET											
THRU																
2N5670				TABLE8	FET											
2N5671	S	N			SP	80	C	120	X	30	20	15 A	50 T		500/2000	3/
2N5672	S	N			SP	80	C	150	X	30	20	15 A	50 T		500/2000	3/
2N5675	S	P			AP	1.0	A	100	0	2.0	50	0.5 A	50 T	80		5/
2N5676	S	P			AP	2.0	A	100	0	2.0	50	0.5 A	50 T	80		66/
2N5677	S	P			SP	50	C	100	0	10	30	5.0 A	20 T		500/2000	61/
2N5678	S	P			SP	100	C	100	0	20	25	10 A	20 T		500/2000	63/
★2N5679	S	P		2N5679	AP	10	C	100	0	1.0	40	250 m	30 T	50		5/31
★2N5680	S	P		2N5679	AP	10	C	120	0	1.0	40	250 m	30 T	50		5/31
★2N5681	S	N		2N5681	AP	10	C	100	0	1.0	40	250 m	30 T	50		5/31
★2N5682	S	N		2N5681	AP	10	C	120	0	1.0	40	250 m	30 T	50		5/31
★2N5683	S	P		2N5683	AP	300	C	60	0	50	15	25 A	2.0 T	2000		/197
★2N5684	S	P		2N5683	AP	300	C	80	0	50	15	25 A	2.0 T	2000		/197
★2N5685	S	N		2N5683	AP	300	C	60	0	50	15	25 A	2.0 T	1200		/197
★2N5686	S	N		2N5683	AP	300	C	80	0	50	15	25 A	2.0 T	1200		/197
2N5687	S	N			AP	5.0	C	20	0	0.5	15	50 m		15		39/
2N5688	S	N			AP	10	C	20	0	0.5	15	50 m		15		117/
2N5689	S	N			AP	25	C	40	0	3.0	15	100 m		40		117/
2N5690	S	N			AP	50	C	30	0	5.0	10	100 m		50		128/
2N5691	S	N			AP	88	C	30	0	8.0	10	100 m		160		
★2N5692	G	P		2N5692	AP	120	C	30	0	40	20	25 A	200 T		200/2300	3/
★2N5693	G	P		2N5693	SP	120	C	60	0	40	20	25 A	200 T		200/2300	3/
★3N5694	G	P		2N5694	SP	120	C	80	0	40	20	25 A	200 T		200/2300	3/
★2N5695	G	P		2N5695	SP	120	C	100	0	40	20	25 A	200 T		200/2300	3/
★2N5696	G	P		2N5696	SP	120	C	120	0	40	20	25 A	200 T		200/2300	3/
2N5697	S	N			AP	3.5	C	18	0	0.5	30	40 m		10		39/79
2N5698	S	N			AP	5.0	C	18	0	0.5	30	40 m		20		131/
2N5699	S	N			AP	10	C	18	0	1.0	15	50 m		30		129/
2N5700	S	N			AP	35	C	18	0	3.0	30	50 m		30		129/
2N5701	S	N			AP	35	C	18	0	3.0	30	50 m		40		129/
2N5702	S	N			AP	0.88	C	18	0	0.5	15	50 m		20		39/
2N5703	S	N			AP	10	C	18	0	0.75	15	50 m		15		117/
2N5704	S	N			AP	25	C	18	0	2.0	15	50 m		35		117/
2N5705	S	N			AP	44	C	18	0	4.0	15	100 m		55		128/
2N5706	S	N			AP	80	C	18	0	7.0	15	100 m		100		
2N5707	S	N			AP	70	S	50	0	4.0	5.0	100 m	50 T	60		128/
2N5708	S	N			AP	100	S	50	0	6.0	5.0	100 m	50 T	90		128/
2N5709	S	N			AP	140	S	50	0	12	5.0	200 m	50 T			
2N5710	S	N			AP	3.5	C	20	0	0.5	20	10 m		6.0		39/
2N5711	S	N			AP	10	C	36	0	0.75	20	50 m		6.0		117/
2N5712	S	N			AP	25	C	40	0	2.0	10	100 m		40		117/
2N5713	S	N			A	45	C	40	0	5.0	10	10 m		80		128/
2N5714	S	N			A	70	C	40	0	8.0	10	10 m		160		
2N5715	S	N			AP	6.0	S	3	0	0.2	20	50 m	3500 T			
2N5716				TABLE8	FET											
THRU																
2N5718				TABLE8	FET											
2N5719				TABLE7	THY											
THRU																
2N5728				TABLE7	THY											
2N5729	S	N	2N5336	2N5336	SP	10	C	80	0	5.0	30	2.0 A	30 T	150	200/800	5/
2N5730	S	N	2N5346	2N5346	SP	45	C	80	0	10	30	2.0 A	30 T	150	200/800	59/
2N5731	S	N	2N5347	2N5346	SP	75	C	80	0	20	30	5.0 A	30 T	350	300/900	61/
2N5732	S	N			SP	75	C	80	0	20	30	5.0 A	30 T	350	300/900	3/
2N5733	S	N	MJ7000	MJ7000	SP	150	C	80	0	30	30	10 A	30 T	750	700/400	63/
2N5734	S	N	2N5886	2N5883	SP	150	C	80	0	30	30	10 A	30 T	750	700/400	3/
2N5735	S	N			SH	0.36	A	30	0	0.3	40	150 m	200 T		60/325	122/
2N5736	S	N			SH	0.36	A	30	0	0.3	100	150 m	200 T		60/325	122/
2N5737	S	P	2N5875	2N5875	AP	50	C	60	0	10	20	5.0 A	10 T	250		3/
2N5738	S	P	2N6229	2N6229	AP	50	C	100	0	10	20	5.0 A	10 T	250		3/
2N5739	S	P	2N5875	2N5875	AP	20	C	60	0	10	20	5.0 A	10 T	250		66/
2N5740	S	P			AP	20	C	100	0	10	20	5.0 A	10 T	250		66/
2N5741	S	P	2N5883	2N5883	AP	65	C	60	0	20	20	10 A	10 T	500		3/
2N5742	S	P	2N6029	2N6029	AP	65	C	100	0	20	20	10 A	10 T	500		3/
2N5743	S	P	2N5883	2N5883	AP	25	C	60	0	20	20	10 A	10 T	500		66/
2N5744	S	P	2N5884	2N5883	AP	25	C	100	0	20	20	10 A	10 T	500		66/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts / REF. POINT	V_{CE}- Volts / SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. / Case No.
2N5745	S	P		2N4398	AP	200 C	80 0	20	15	10 A	2.0 T		100/300	
2N5754				TABLE7	THY									
THRU														
2N5757				TABLE7	THY									
★2N5758	S	N		2N5758	AP	150 C	100 0	6.0	25	3.0 A	1.0 T	300		3/11
★2N5759	S	N		2N5758	AP	150 C	120 0	6.0	20	3.0 A	1.0 T	300		3/11
★2N5760	S	N		2N5758	AP	150 C	140 0	6.0	15	3.0 A	1.0 T	300		3/11
2N5761	S	N			AH	0.25 A	15 0	0.03	30	10 m	3000 T			
2N5762	S	N			AH	0.3 A	15 0	0.04	30	15 m	2500 T			
★2N5763	S	P		2N5763	SP	0.4 A	60 0	0.6	70	10 m	200 T		50/200	18/22
2N5764	S	N			AH	10 S	25 0	0.75	20	.10 A		6.0		
2N5765	S	N			AH	19 S	25 0	1.5	20	.10 A		12		
2N5766	S	N			AH	5.0 S	25 0	0.2	20	.05 A				
2N5767	S	N			AH	10 S	25 0	0.35	20	.10 A		5.0		
2N5768	S	N			AH	20 S	25 0	0.7	20	.10 A		10		
2N5773	S	N			AP	5.0 C	35 0	0.5	20	.05 A		4.5		
2N5774	S	N			AP	18 C	35 0	1.5	20	0.1 A		14		129/
2N5775	S	N			AP	40 C	35 0	3.5	10	0.1 A		26		
2N5776	S	N			AP	70 C	35 0	6.0	10	0.2 A		50		
★2N5777	S	N		2N5777	RD	0.2 A	25 0							92/29
★2N5778	S	N		2N5777	RD	0.2 A	40 0							
★2N5779	S	N		2N5777	RD	0.2 A	25 0							92/29
★2N5780	S	N		2N5777	RD	0.2 A	40 0							92/29
2N5781	S	P	2N3720	2N3719	AP	10 C	80 R	3.5	4.0	3.2 A	8.0 T			5/
2N5782	S	P	2N3720	2N3719	AP	10 C	65 R	3.5	4.0	3.2 A	8.0 T			5/
2N5783	S	P	2N3867		AP	10 C	45 R	3.5	4.0	3.2 A	8.0 T			5/
2N5784	S	N	2N5335	2N5334	AP	10 C	80 R	3.5	4.0	3.2 A	1.0 T			5/
2N5785	S	N	2N5334	2N5334	AP	10 C	65 R	3.5	4.0	3.2 A	1.0 T			5/
2N5786	S	N	2N5336	2N5336	AP	10 C	45 R	3.5	4.0	3.2 A	1.0 T			5/
★2N5793	S	N		2N5793	SH	0.5 A	40 0	0.6	40	150 m	250 T		45/310	78/654
★2N5794	S	N		2N5793	SH	0.5 A	40 0	0.6	100	150 m	250 T		45/310	78/654
★2N5795	S	N		2N5795	SH	0.5 A	60 0	0.6	40	150 m	200 T		47/140	78/654
★2N5796	S	N		2N5795	SH	0.5 A	60 0	0.6	100	150 m	200 T		47/140	78/654
2N5797				TABLE8	FET									
THRU														
2N5803				TABLE8	FET									
2N5804	S	N			SP	62 C	300 X	5.0	10	5.0 A	15 T		500/5500	3/
2N5805	S	N			SP	62 C	375 X	5.0	10	5.0 A	15 T		500/5500	3/
2N5806				TABLE7	THY									
THRU														
2N5809				TABLE7	THY									
2N5810	S	N			A	0.5 A	25 0	0.75	60	2.0 m				
2N5811	S	N			A	0.5 A	25 0	0.75	60	2.0 m				
2N5812	S	N			A	0.5 A	25 0	0.75	150	2.0 m				
2N5813	S	P			A	0.5 A	25 0	0.75	150	2.0 m				
2N5814	S	N			A	0.5 A	40 0	0.75	60	2.0 m				
2N5815	S	P			A	0.5 A	40 0	0.75	60	2.0 m				
2N5816	S	N			A	0.5 A	40 0	0.75	100	2.0 m				
2N5817	S	P			A	0.5 A	40 0	0.75	100	2.0 m				
2N5818	S	N			A	0.5 A	40 0	0.75	150	2.0 m				
2N5819	S	P			A	0.5 A	40 0	0.75	150	2.0 m				
2N5820	S	N			A	0.5 A	60 0	0.75	60	2.0 m				
2N5821	S	P			A	0.5 A	60 0	0.5	60	2.0 m				
2N5822	S	N			A	0.5 A	60 0	0.5	100	2.0 m				
2N5823	S	P			A	0.5 A	60 0	0.75	100	2.0 m				
2N5824	S	N			A	0.36 A	40 0	0.1	60	2.0 m				
2N5825	S	N			A	0.36 A	40 0	0.1	100	2.0 m				
2N5826	S	N			A	0.36 A	40 0	0.1	150	2.0 m				
2N5827,A	S	N			A	0.36 A	40 0	0.1	250	2.0 m				
2N5828,A	S	N			A	0.36 A	40 0	0.1	400	2.0 m				
★2N5829	S	P		2N5829	AH	0.2 A	30 0	0.03	20	2.0 m	1200			72/20
2N5830	S	N			A	0.625 A	100 0	0.6	80	10 m	100 T			106/
2N5831	S	N			A	0.625 A	140 0	0.6	80	10 m	100 T			106/
2N5832	S	N			A	0.625 A	140 0	0.6	175	10 m	100 T			106/
2N5833	S	N			A	0.625 A	180 0	0.6	50	10 m	100 T			106/
2N5834	S	P			SP	5.0 A	40 0	1.0	10	250 m		10		39/
★2N5835	S	N		2N5835	SH	0.2 A	10 0	0.015	25	10 m	2500 T			72/20
★2N5836	S	N		2N5835	SH	2.0 C	10 0	0.2	25	50 m	2000 T			46/26
★2N5837	S	N		2N5835	SH	2.0 C	5.0 0	0.3	25	100 m	1700 T			46/26
2N5838	S	N			SP	57 C	275 X	3.0	8.0	3.0 A	5.0 T		1500/4500	3/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	Case No.
2N5839	S	N			SP	57	C	300	X	3.0	10	2.0 A	5.0 T		1500/5250	3	
2N5840	S	N			SP	57	C	375	X	3.0	10	2.0 A	5.0 T		1750/4500		
★2N5841	S	N		2N5841	SH	0.35	C	10	0	0.1	25	25 m	2200 T		0.40/0.30	72	20
★2N5842	S	N		2N5841	SH	0.35	C	10	0	0.1	25	25 m	1700 T		0.40/0.30	72	20
★2N5843	S	P		2N5843	AM	0.5	A	40	0	0.05	50	0.1 m	200 T			78	654
2N5844	S	P		2N5843	AM	0.5	A	40	0	0.05	100	0.1 m	250 T			78	654
★2N5845	S	N		2N5845	S	1.2	C	40	0	0.6	25	500 m	200 T	9.0	40/60	92	29
★2N5845A	S	N		2N5845	S	1.2	C	40	0	0.6	35	500 m	250 T		30/50	92	29
★2N5846	S	N		2N5846	AH	10	C	18	0	1.0	5.0	250 m		25		102	24
★2N5847	S	N		2N5846	AW	20	C	18	0	2.0	5.0	0.5 A		90			145
★2N5848	S	N		2N5848	AP	50	C	24	0	3.5	3.0	1.2 A		125			145
★2N5849	S	N		2N5849	AP	100	C	24	0	7.0	3.0	2.4 A		230			145
★2N5851	S	N		2N5851	S	0.5	C	15	0	0.1	40	10 m	800 T			72	20
★2N5852	S	N		2N5851	S	0.5	C	15	0	0.1	40	10 m	1100 T			72	20
2N5853	S	P			AP	66	C	80	0	10	30	5.0 A	15 T			61	
2N5854	S	N			AP	66	C	80	0	10	30	5.0 A	20 T			61	
2N5855	S	P			A	0.75	A	60	0	1.0	50	150 m	100 T	15		105	
2N5856	S	N			A	0.75	A	60	0	1.0	50	150 m	100 T	15		105	
2N5857	S	P			A	0.75	A	80	0	1.0	50	150 m	100 T	15		105	
2N5858	S	N			A	0.75	A	80	0	1.0	50	150 m	100 T	15		105	
★2N5859	S	N		2N5859	SHF	5.0	C	40	0	2.0	15	1.0 A	250 T		35/60	39	79
★2N5860	S	N		2N5859	SHF	5.0	C	45	0	2.0	15	1.0 A	250 T		25/60	39	79
★2N5861	S	N		2N5860	SHF	5.0	C	50	0	2.0	25	0.5 A	200 T		25/60		
★2N5862	S	N		2N5862		80		35	0	8.0	5.0	3.0 A		130			145
★2N5864	S	P		2N5864	A	1.25	A	70	0	1.5	50	150 m	50 T			39	79
★2N5865	S	P		2N5865	S	1.25	A	50	0	1.0	40	150 m	100 T		120/500	39	79
★2N5867	S	P		2N5867	AP	87.5	C	60	0	5.0	20	1.5 A	4.0 T	200	700/1800	3	11
★2N5868	S	P		2N5867	AP	87.5	C	80	0	5.0	20	1.5 A	4.0 T	200	700/1800	3	11
★2N5869	S	N		2N5867	AP	87.5	C	60	0	5.0	20	1.5 A	4.0 T	150	700/1800	3	11
★2N5870	S	N		2N5867	AP	87.5	C	80	0	5.0	20	1.5 A	4.0 T	150	700/1800	3	11
★2N5871	S	P		2N5871	AP	100	C	60	0	7.0	20	2.5 A	4.0 T	300	700/1800	3	11
★2N5872	S	P		2N5871	AP	100	C	80	0	7.0	20	2.5 A	4.0 T	300	700/1800	3	11
★2N5873	S	N		2N5871	AP	100	C	60	0	7.0	20	2.5 A	4.0 T	250	700/1800	3	11
★2N5874	S	N		2N5871	AP	100	C	80	0	7.0	20	2.5 A	4.0 T	250	700/1800	3	11
★2N5875	S	P		2N5875	AP	150	C	60	0	10	20	4.0 A	4.0 T	500	700/1800	3	11
★2N5876	S	P		2N5875	AP	150	C	80	0	10	20	4.0 A	4.0 T	500	700/1800	3	11
★2N5877	S	N		2N5875	AP	150	C	60	0	10	20	4.0 A	4.0 T	300	700/1800	3	11
★2N5878	S	N		2N5875	AP	150	C	80	0	10	20	4.0 A	4.0 T	300	700/1800	3	11
★2N5879	S	P		2N5879	AP	160	C	60	0	15	20	6.0 A	4.0 T	600	700/1800	3	11
★2N5880	S	P		2N5879	AP	160	C	80	0	15	20	6.0 A	4.0 T	600	700/1800	3	11
★2N5881	S	N		2N5879	AP	160	C	60	0	15	20	6.0 A	4.0 T	400	700/1800	3	11
★2N5882	S	N		2N5879	AP	160	C	80	0	15	20	6.0 A	4.0 T	400	700/1800	3	11
★2N5883	S	P		2N5883	AP	200	C	60	0	25	20	10 A	4.0 T	1000	700/1800	3	11
★2N5884	S	P		2N5883	AP	200	C	80	0	25	20	10 A	4.0 T	1000	700/1800	3	11
★2N5885	S	N		2N5883	AP	200	C	60	0	25	20	10 A	4.0 T	500	700/1800	3	11
★2N5886	S	N		2N5883	AP	200	C	80	0	25	20	10 A	4.0 T	500	700/1800	3	11
★2N5887	G	P		2N5887	AP	57	C	15	0	7.0	15	0.5 A	0.25 T			66	80
★2N5888	G	P		2N5887	AP	57	C	25	0	7.0	15	0.5 A	0.25 T			66	80
★2N5889	G	P		2N5887	AP	57	C	25	0	7.0	30	0.5 A	0.25 T			66	80
★2N5890	G	P		2N5887	AP	57	C	35	0	7.0	30	0.5 A	0.25 T			66	80
★2N5891	G	P		2N5877	AP	57	C	45	0	7.0	30	0.5 A	0.25 T			66	80
★2N5892	G	P		2N5877	AP	57	C	60	0	5.0	30	0.5 A	0.25 T			66	80
★2N5893	G	P		2N5877	AP	57	C	25	0	5.0	60	0.5 A	0.25 T			66	80
★2N5894	G	P		2N5877	AP	57	C	35	0	5.0	60	0.5 A	0.25 T			66	80
★2N5895	G	P		2N5877	AP	57	C	45	0	5.0	60	0.5 A	0.25 T			66	80
★2N5896	G	P		2N5877	AP	57	C	60	0	5.0	60	0.5 A	0.25 T			66	80
★2N5897	G	P		2N5877	AP	57	C	25	0	5.0	100	0.5 A	0.25 T			66	80
★2N5898	G	P		2N5877	AP	57	C	35	0	5.0	100	0.5 A	0.25 T			66	80
★2N5899	G	P		2N5877	AP	57	C	45	0	5.0	100	0.5 A	0.25 T			66	80
★2N5900	G	P		2N5877	AP	57	C	60	0	5.0	100	0.5 A	0.25 T			66	80
★2N5901	G	P		2N5877	AP	57	C	25	0	5.0	175	0.5 A	0.25 T			66	80
2N5902				TABLE8	FET												
THRU																	
2N5909				TABLE8	FET												
2N5910	S	P			S	0.31	A	20	0	0.05	30	.01 A	700 T		15/20	106	
2N5911				TABLE8	FET												
2N5912				TABLE8	FET												
2N5913	S	N			AH	3.5	C	14	0	0.33				15		39	79
2N5914	S	N			AH	5.7	C	14	0	0.5				15			
2N5915	S	N			AH	10.7	C	14	0	1.5				30			

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N5916	S	N			AH	4.0	C	24	0	0.2	20	50 m	1000 T			
2N5917	S	N			AH	4.0	C	24	0	0.2	20	50 m	1000 T			
2N5918	S	N			AH	10	C	24	0	0.75				13		
2N5919	S	N			AH	25	C	30	0	1.5				22		
2N5919A	S	N			AP	25	C	30	0	4.5				22		216/
2N5920	S	N			AH	3.5	C	50	R	0.25				3.0		
2N5921	S	N			AH	14.5	C	50	R	0.7				8.5		
2N5922	S	N			AP	5.0	C	35	0	0.425						
2N5923	S	N			AP	6.0	C	35	0	0.75				6.0		
2N5924	S	N			AP	10	C	35	0	1.5				10		
2N5925	S	N			AP	13	C	35	0	2.5				20		
2N5926	S	N			SP	200	C	120	0	50	10	50 A	5.0 T		600/1000	63/188
2N5927	S	N			SP	200	C	120	0	100	10	70 A	5.0 T		600/1000	114/177
2N5928	S	N			SP	200	C	120	0	100	10	100 A	5.0 T		700/300	114/177
2N5929	S	N			SP	100	C	80	X	30	20	10 A	30 T		500/800	
2N5930	S	N			SP	100	C	120	X	30	20	10 A	30 T		500/800	
2N5931	S	N			SP	100	C	160	X	30	20	10 A	30 T		500/800	
2N5932	S	N			SP	100	C	60	X	30	20	10 A	30 T		600/900	
2N5933	S	N			SP	100	C	100	X	30	20	20 A	30 T		600/900	
2N5934	S	N			SP	100	C	140	X	30	20	20 A	30 T		600/900	
2N5935	S	N			SP	100	C	80	X	30	20	30 A	30 T		700/1000	
2N5936	S	N			SP	100	C	120	X	30	20	30 A	30 T		700/1000	
2N5937	S	N			SP	100	C	160	X	30	20	30 A	30 T		600/400	
2N5938	S	N			AP	2.5	A	50	0	3.0	30	1.0 A	150 T	80		
2N5939	S	N			AP	2.0	A	80	0	10	40	5.0 A	120 T			111/
2N5940	S	N			AP	2.0	A	70	0	10	40	5.0 A	120 T			
★2N5941	S	N		2N5941	AH	80	C	35	0	6.0	10	0.5 A	50 T	125		/211
★2N5942	S	N		2N5941	AH	140	C	35	0	12	10	1.0 A	50 T	250		/211
★2N5943	S	N		2N5943	A	3.5	C	30	0	0.4	25	50 m	1200 T			39/79
★2N5944	S	N		2N5944	AP	5.0	C	16	0	0.4	20	0.1 A		15		/244
★2N5945	S	N		2N5944	AP	15	C	16	0	0.8	20	0.2 A		25		/244
★2N5946	S	N		2N5944	AP	37.5	C	16	0	2.0	20	0.5 A		45		/244
★2N5947	S	N		2N5947	A	16	C	30	0	0.4	25	75 m	1100 T			/144
2N5949 THRU				TABLE8	FET											
2N5953				TABLE8	FET											
2N5954	S	P			AP	40	C	85	R	6.0	20	2.0 A	5.0 T			66/80
2N5955	S	P			AP	40	C	65	R	6.0	20	2.5 A	5.0 T			66/80
2N5956	S	P			AP	40	C	45	R	6.0	20	3.0 A	5.0 T			66/80
2N5957	S	N	MJ7000	MJ7000	AP	100	C	100	0	20	30	10 A	10 T	350	500/1000	61/9
2N5958	S	P			AP	100	C	100	0	20	30	10 A	20 T	675	500/1000	61/9
2N5959	S	N			AP	100	C	100	0	20	30	10 A	10 T	350	500/1000	61/9
2N5960	S	P			AP	100	C	100	0	20	30	10 A	20 T	675	500/1000	61/9
2N5961	S	N			AH	0.625	A	60	0		150	10 m	100 T			92/29
2N5962	S	N			AH	0.625	A	45	0		600	10 m	100 T			92/29
2N5963	S	N			AH	0.625	A	30	0		2.2k	10 m	150 T			92/29
2N5964	S	N			AH	0.7	A	150	0	0.6	50	10 m	100 T			105/
2N5965	S	N			AH	0.7	A	180	0	0.6	50	10 m	100 T			105/
2N5966	S	N			AP	125	C	100	0	40	30	10 A	10 T	550	500/1000	63/188
2N5967	S	P			AP	125	C	100	0	40	30	10 A	20 T	875	500/1000	63/188
2N5968	S	N			AP	125	C	100	0	40	30	10 A	10 T	550	500/1000	63/188
2N5969	S	P			AP	125	C	100	0	40	30	10 A	20 T	875	500/1000	
2N5970	S	N			SP	85.5	C	80	X	15	20	5.0 A	4.0 T		600/1900	3/
2N5971	S	N			SP	85.5	C	80	X	15	50	5.0 A	4.0 T		600/1900	3/
2N5972	S	N			SP	85.5	C	90	X	15	25	5.0 A	4.0 T		600/1900	3/
2N5973	S	N			SP	85.5	C	100	X	15	25	0.5 A	4.0 T		600/2000	3/
★2N5974	S	P	2N4904	2N4904	AP	75	C	40	0	5.0	20	2.5 A	2.0 T	300		/90
★2N5975	S	P	2N5871	2N5871	AP	75	C	60	0	5.0	20	2.5 A	2.0 T	300		/90
★2N5976	S	P	2N5872	2N5871	AP	75	C	80	0	5.0	20	2.5 A	2.0 T	300		/90
★2N5977	S	N	2N4913	2N4913	AP	75	C	40	0	5.0	20	2.5 A	2.0 T	200		/90
★2N5978	S	N	2N5873	2N5871	AP	75	C	60	0	5.0	20	2.5 A	2.0 T	200		/90
★2N5979	S	N	2N5874	2N5871	AP	75	C	80	0	5.0	20	2.5 A	2.0 T	200		/90
★2N5980	S	P	MJ2267		AP	90	C	40	0	8.0	20	4.0 A	2.0 T	350		/90
★2N5981	S	P	2N5875	2N5875	AP	90	C	60	0	8.0	20	4.0 A	2.0 T	350		/90
★2N5982	S	P	2N5876	2N5875	AP	90	C	80	0	8.0	20	4.0 A	2.0 T	350		/90
★2N5983	S	N	2N5877	2N5875	AP	90	C	40	0	8.0	20	4.0 A	2.0 T	250		/90
★2N5984	S	N	2N5877	2N5875	AP	90	C	60	0	8.0	20	4.0 A	2.0 T	250		/90
★2N5985	S	N	2N5878	2N5875	AP	90	C	80	0	8.0	20	4.0 A	2.0 T	250		/90
★2N5986	S	P	2N5879	2N5879	AP	100	C	40	0	12	20	6.0 A	2.0 T	500		/90
★2N5987	S	P	2N5879	2N5879	AP	100	C	60	0	12	20	6.0 A	2.0 T	500		/90

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE	
											Min					TO- No.	Case No.
★2N5988	S	P	2N5880	2N5879	AP	100	C	80	0	12	20	6.0 A	2.0 T	500			90
★2N5989	S	N	2N5881	2N5879	AP	100	C	40	0	12	20	6.0 A	2.0 T	300			90
★2N5990	S	N	2N5881	2N5879	AP	100	C	60	0	12	20	6.0 A	2.0 T	300			90
★2N5991	S	N	2N5882	2N5879	AP	100	C	80	0	12	20	6.0 A	2.0 T	300			90
2N5992	S	N			AP	35.7	C	30	0	5.0				70			
2N5993	S	N			AP	35.7	C	18	0	5.0				100			
2N5994	S	N			AP	35.7	C	30	0	5.0				70			
2N5995	S	N			AP	10.7	C	14	0	1.5				80			
2N5996	S	N			AP	35.7	C	18	0	5.0				100			
2N6000	S	N			A	0.8	C	25	0		100	10 m	350 T		25/320		
2N6001	S	P			A	0.8	C	25	0		100	10 m	700 T		23/230		
2N6002	S	N			A	0.8	C	25	0		250	10 m	450 T		25/410		
2N6003	S	P			A	0.8	C	25	0		250	10 m	800 T		23/300		
2N6004	S	N			A	0.8	C	40	0		100	10 m	350 T		25/320		
2N6005	S	P			A	0.8	C	40	0		100	10 m	700 T		23/230		
2N6006	S	N			A	0.8	C	40	0		250	10 m	450 T		25/410		
2N6007	S	P			A	0.8	C	40	0		250	10 m	800 T		23/300		
2N6010	S	N			A	1.0	C	40	0		100	10 m	330 T		37/400		
2N6011	S	P			A	1.0	C	40	0		100	10 m	240 T		45/425		
2N6012	S	N			A	1.0	C	40	0		250	10 m	420 T		37/500		
2N6013	S	P			A	1.0	C	40	0		250	10 m	360 T		45/525		
2N6014	S	N			A	1.0	C	60	0		100	10 m	330 T		37/400		
2N6015	S	P			A	1.0	C	60	0		100	10 m	240 T		45/425		
2N6016	S	N			A	1.0	C	60	0		250	10 m	420 T		37/500		
2N6017	S	P			A	1.0	C	60	0		250	10 m	360 T		45/525		
2N6021	S	P	2N5867	2N5867	A	36	C	70	0	4.0	30	0.5 A	0.8 T				
2N6022	S	P	2N4920	2N4918	A	36	C	70	0	4.0	30	0.5 A	0.8 T				
2N6023	S	P	2N5867	2N5867	A	36	C	40	0	4.0	30	1.0 A	0.8 T				
2N6024	S	P	2N4918	2N4918	A	36	C	40	0	4.0	30	1.0 A	0.8 T				
2N6025	S	P	2N5867	2N5867	A	36	C	60	0	4.0	20	1.5 A	0.8 T				
2N6026	S	P	2N4919	2N4918	A	36	C	60	0	4.0	20	1.5 A	0.8 T				
2N6027				TABLE9	PUT												
2N6028				TABLE9	PUT												
★2N6029	S	P		2N6029	AP	200	C	100	0	16	25	8.0 A	1.0 T	1000		3	11
★2N6030	S	P		2N6029	AP	200	C	120	0	16	20	8.0 A	1.0 T	1000		3	11
★2N6031	S	P		2N6029	AP	200	C	140	0	16	15	8.0 A	1.0 T	1000		3	11
2N6032	S	N	2N5686	2N5685	SP	80	C	90	0		10	50 A	50 T		1000/2000		
2N6033	S	N	2N5686	2N5685	SP	80	C	120	0		10	40 A	50 T		1000/2000		
★2N6034	S	P		2N6034	AP	40	C	40	0	4.0	750	2.0 A	25 T	200			77
★2N6035	S	P		2N6034	AP	40	C	60	0	4.0	750	2.0 A	25 T	200			77
★2N6036	S	P		2N6034	AP	40	C	80	0	4.0	750	2.0 A	25 T	200			77
★2N6040	S	P		2N6040	AP	75	C	60	0	8.0	100	8.0 A	4.0 T	300			90
★2N6041	S	P		2N6040	AP	75	C	80	0	8.0	100	8.0 A	4.0 T				90
★2N6042	S	P		2N6040	AP	75	C	100	0	8.0	100	8.0 A	4.0 T	300			90
★2N6043	S	N		2N6040	AP	75	C	60	0	8.0	100	8.0 A	4.0 T	200			90
★2N6044	S	N		2N6040	AP	75	C	80	0	8.0	100	8.0 A	4.0 T				90
★2N6045	S	N		2N6040	AP	75	C	100	0	8.0	100	8.0 A	4.0 T	200			90
2N6046	S	N	MJ7000	MJ7000	SP	114	C	60	0		20	20 A	30 T		600/900	63	
2N6047	S	N	MJ7000	MJ7000	SP	114	C	100	0		20	20 A	30 T		600/900	63	
2N6048	S	N	2N6280	2N6278	SP	114	C	140	0		20	20 A	30 T		600/900	63	
★2N6049	S	P		2N6049	AP	75	C	55	0	4.0	25	500 m	3.0 T	200		66	80
★2N6050	S	P		2N6050	AP	150	C	60	0	12	750	6.0 A	4.0 T	500		3	11
★2N6051	S	P		2N6050	AP	150	C	80	0	12	750	6.0 A	4.0 T			3	11
★2N6052	S	P		2N6050	AP	150	C	100	0	12	750	6.0 A	4.0 T	500		3	11
★2N6053	S	P		2N6053	AP	150	C	60	0	8.0	750	6.0 A	4.0 T	300		3	11
★2N6054	S	P		2N6053	AP	150	C	80	0	8.0	750	6.0 A	4.0 T	300		3	11
★2N6055	S	N		2N6053	AP	100	C	60	0	8.0	750	4.0 A	4.0 T	200		3	11
★2N6056	S	N		2N6053	AP	100	C	80	0	8.0	750	4.0 A	4.0 T	200		3	11
★2N6057	S	N		2N6050	AP	150	C	60	0	12	750	6.0 A	4.0 T	300		3	11
★2N6058	S	N		2N6050	AP	150	C	80	0	12	750	6.0 A	4.0 T			3	11
★2N6059	S	N		2N6050	AP	150	C	100	0	12	750	6.0 A	4.0 T	300		3	11
2N6060	S	N			AP	150	C	100	0		20	20 A	10 T	850	500/1000	63	
2N6061	S	P			AP	150	C	100	0		20	20 A	20 T	1325	500/1000	63	
2N6062	S	N	MJ7000	MJ7000	AP	150	C	100	0		20	20 A	10 T	850	500/1000	63	
2N6063	S	P			AP	150	C	100	0		20	20 A	20 T	1325	500/1000	63	
★2N6064	G	P		2N6064	SP	56	C	80	0	10	20	3.0 A	300 T		100/150		8
★2N6065	G	P		2N6064	SP	56	C	120	0	10	20	3.0 A	300 T		100/150		8
★2N6066	G	P		2N6064	SP	56	C	160	0	10	20	3.0 A	300 T		100/150		8
★2N6067	S	P		2N6067	S	0.625	A	40	0	1.0	50	100 m	150 T		40/80	92	29
2N6068				TABLE7	THY												

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
THRU																
2N6075				TABLE7	THY											
2N6068A				TABLE7	THY											
THRU																
2N6075A				TABLE7	THY											
2N6076	S	P	MPS6519	MPS6512	A	0.36	A	25	0		100	10 m				
2N6077	S	N			SP	25.7	C	300	X		12	1.2 A	1.0 T		750/5750	66/80
2N6078	S	N			SP	25.7	C	275	X		12	1.2 A	1.0 T		750/5750	66/80
2N6079	S	N			SP	25.7	C	375	X		12	1.2 A	1.0 T		750/5750	66/80
★2N6080	S	N		2N6080	A	12	C	18	0	1.0	5.0	.25 A		20		/145
★2N6081	S	N		2N6080	A	13	C	18	0	2.5	5.0	0.5 A		85		/145
★2N6082	S	N		2N6082	A	50	C	18	0	4.0	5.0	1.0 A		130		/145
★2N6083	S	N		2N6082	A	50	C	18	0	4.0	5.0	1.0 A		130		/145
★2N6084	S	N		2N6082	A	75	C	18	0	6.0	5.0	1.0 A		200		/145
2N6085	S	N			A	0.75	C	45	0		60	10 *	60 T			78/
2N6086	S	N			A	0.75	C	45	0		150	10 *	60 T			78/
2N6087	S	N			A	0.75	C	45	0		60	10 *	60 T			78/
2N6088	S	N			A	0.75	C	45	0		150	10 *	60 T			78/
2N6089	S	N			A	0.75	C	45	0		60	10 *	60 T			78/
2N6090	S	N			A	0.75	C	45	0		150	10 *	60 T			78/
2N6091	S	N			A	0.75	C	60	0		60	10 *	60 T			78/
2N6092	S	N			A	0.75	C	60	0		150	10 *	60 T			78/
2N6093	S	N			AH	83.3	C	35	0		20	5.0 A	100 T	250		
★2N6094	S	P		2N6094	AP	8.0	C	18	0	1.0	5.0	.25 A		20		/211
★2N6095	S	P		2N6094	AP	20	C	18	0	2.5	15	0.5 A		120		/211
★2N6096	S	P		2N6094	AP	40	C	18	0	4.0	15	0.5 A		190		/211
★2N6097	S	P		2N6094	AP	60	C	18	0	6.0	15	0.5 A		400		/211
2N6098	S	N	2N5877	2N5875	AP	75	C	60	0	10	20	4.0 A	0.8 T			220AA/
2N6099	S	N	2N5983	2N5983	AP	75	C	60	0	10	20	4.0 A	0.8 T			220AB/
2N6100	S	N	2N5878	2N5875	AP	75	C	70	0	10	20	5.0 A	0.8 T			220AA/
2N6101	S	N	2N5991	2N5986	AP	75	C	70	0	10	20	5.0 A	0.8 T			220AB/
2N6102	S	N	MJ2801	MJ2801	AP	75	C	40	0	16	15	8.0 A	0.8 T			220AA/
2N6103	S	N			AP	75	C	40	0	16	15	8.0 A	0.8 T			220AB/
2N6104	S	N			AH	36	C	30	0	4.5				35		
2N6105	S	N			AH	36	C	30	0	4.5				3.5		
2N6106	S	P	2N5872	2N5871	A	40	C	70	0		30	2.0 A	10 T	250		220AB/
2N6107	S	P			A	40	C	70	0		30	2.0 A	10 T	250		220AA/
2N6108	S	P	2N5871	2N5871	A	40	C	50	0		30	2.5 A	10 T	250		220AA/
2N6109	S	P			A	40	C	50	0		30	2.5 A	10 T	250		220AB/
2N6110	S	P	2N4904	2N4904	A	40	C	30	0		30	3.0 A	10 T	250		220AA/
2N6111	S	P			A	40	C	30	0		30	3.0 A	10 T	250		220AB/
2N6112	S	N			AH	0.36	C	30	0		185	2.0 m	160 T	10		
2N6114				TABLE10	UJT											
2N6115				TABLE10	UJT											
2N6116				TABLE9	PUT											
THRU																
2N6120				TABLE9	PUT											
2N6121	S	N			AP	40	C	45	0	4.0	25	1.5 A	2.5 T			220AB/
2N6122	S	N			AP	40	C	60	0	4.0	25	1.5 A	2.5 T			220AB/
2N6123	S	N			AP	40	C	80	0	4.0	20	1.5 A	2.5 T			220AB/
2N6124	S	P			AP	40	C	45	0	4.0	25	1.5 A	2.5 T			220AB/
2N6125	S	P			AP	40	C	60	0	4.0	25	1.5 A	2.5 T			220AB/
2N6126	S	P			AP	40	C	80	0	4.0	20	1.5 A	2.5 T			220AB/
2N6127	S	P			AP	67	C	80	0		30	5.0 A	40 T	500		61/
2N6128	S	N			AP	67	C	80	0		30	5.0 A	50 T	275		61/
2N6129	S	N			AP	50	C	40	0	7.0	20	2.5 A	2.5 T			220AB/
2N6130	S	N			AP	50	C	60	0	7.0	20	2.5 A	2.5 T			220AB/
2N6131	S	N			AP	50	C	40	0	7.0	20	2.5 A	2.5 T			
2N6132	S	P			AP	50	C	40	0	7.0	20	2.5 A	2.5 T			220AB/
2N6133	S	P			AP	50	C	60	0	7.0	20	2.5 A	2.5 T			220AB/
2N6134	S	P			AP	50	C	80	0	7.0	20	2.5 A	2.5 T			220AB/
★2N6135	S	N		2N6135	AH	5.0	C	25	0	0.25	25	80 m	1100 T			/145
★2N6136	S	N		2N6136	AH	60	C	18	0	6.0	20	1.0 A		70		
2N6137				TABLE9	PUT											
2N6138				TABLE9	PUT											
2N6139				TABLE7	THY											
THRU																
2N6165				TABLE7	THY											
2N6166	S	N		2N6166	AH	117	C	35	0	9.0	5.0	500 m		130		/211
2N6167				TABLE7	THY											

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
THRU																
2N6174				TABLE7	THY											
2N6175	S	N			AP	20	C	250	0	1.0	30	20 m	21 T	8.5		
2N6176	S	N			AP	20	C	300	0	1.0	30	20 m	21 T	8.5		
2N6177	S	N			AP	20	C	350	0	1.0	30	50 m	21 T	8.5		
2N6178	S	N			SP	10	C	75	X		30	0.5 A	50 T		80/800	
2N6179	S	N			SP	10	C	50	X		40	0.5 A	50 T		80/800	
2N6180	S	P			SP	10	C	75	X		30	0.5 A	50 T		100/1000	
2N6181	S	P			SP	10	C	50	X		40	0.5 A	50 T		100/1000	
★2N6182	S	P		2N6182	SP	60	C	80	0	10	30	2.0 A	30 T	300	200/400	59/160
★2N6183	S	P		2N6182	SP	60	C	80	0	10	60	2.0 A	30 T	300	200/400	59/160
★2N6184	S	P		2N6182	SP	60	C	100	0	10	30	2.0 A	30 T	300	200/400	59/160
★2N6185	S	P		2N6182	SP	60	C	100	0	10	60	2.0 A	30 T	300	200/400	59/160
★2N6186	S	P		2N6182	SP	60	C	80	0	10	30	2.0 A	30 T	300	200/2200	59/
★2N6187	S	P		2N6182	SP	60	C	80	0	10	60	2.0 A	30 T	300	200/2200	59/
★2N6188	S	P		2N6182	SP	60	C	100	0	10	30	2.0 A	30 T	300	200/2200	59/
★2N6189	S	P		2N6182	SP	60	C	100	0	10	60	2.0 A	30 T	300	200/2200	59/
★2N6190	S	P		2N6190	SP	10	C	80	0	5.0	30	2.0 A	30 T	300	200/2200	39/79
★2N6191	S	P		2N6190	SP	10	C	80	0	5.0	60	2.0 A	30 T	300	200/2200	39/79
★2N6192	S	P		2N6190	SP	10	C	100	0	5.0	30	2.0 A	30 T	300	200/2200	39/79
★2N6193	S	P		2N6190	SP	10	C	100	0	5.0	60	2.0 A	30 T	300	200/2200	39/79
2N6197	S	N			AHP	10	C	35	0					12		
2N6198	S	N			AHP	25	C	35	0					25		
2N6199	S	N			AHP	50	C	35	0					50		
2N6200	S	N			AHP	85	C	35	0					150		
2N6201	S	N			AHP	140	C	35	0					250		
2N6202	S	N			AHP	10	C	33	0					12		
2N6203	S	N			AHP	20	C	33	0					20		
2N6204	S	N			AHP	40	C	33	0					40		
2N6205	S	N			AHP	80	C	33	0					80		
2N6206	S	N			AHP	10	C	30	0					12		
2N6207	S	N			AHP	20	C	30	0					20		
2N6208	S	N			AHP	40	C	30	0					40		
2N6211	S	P			SP	20	C	275	X		10	1.0 A	20 T		600/3100	66/80
2N6212	S	P			SP	20	C	350	X		10	1.0 A	20 T		600/3100	66/80
2N6213	S	P			SP	20	C	400	X		10	1.0 A	20 T		600/3100	66/80
2N6214	S	P			SP	20	C	450	X		10	1.0 A	20 T			
2N6215	S	N			SP	135	C	80	X	50	25	25 A	20 T			63/
2N6216	S	N			AP	71.4	C	200	0		20	5.0 A	20 T	250		3/
2N6217	S	N			AP	71.4	C	80	0		20	5.0 A	20 T	250		3/
★2N6226	S	P		2N6226	AP	150	C	100	0	6.0	25	3.0 A	1.0 T	450		3/11
★2N6227	S	P		2N6226	AP	150	C	120	0	6.0	20	3.0 A	1.0 T	450		3/11
★2N6228	S	P		2N6226	AP	150	C	140	0	6.0	15	3.0 A	1.0 T	450		3/11
★2N6229	S	P		2N6229	AP	150	C	100	0	10	25	5.0 A	1.0 T	600		3/11
★2N6230	S	P		2N6229	AP	150	C	120	0	10	20	5.0 A	1.0 T	600		3/11
★2N6231	S	P		2N6229	AP	150	C	140	0	10	15	5.0 A	1.0 T	600		3/11
★2N6233	S	N		2N6233	SP	50	C	225	0	5.0	25	1.0 A	20 T	250	500/400	66/80
★2N6234	S	N		2N6233	SP	50	C	275	0	5.0	25	1.0 A	20 T	250	500/400	66/80
★2N6235	S	N		2N6233	SP	50	C	325	0	5.0	25	1.0 A	20 T	250	500/400	66/80
2N6236				TABLE7	THY											
THRU																
2N6241				TABLE7	THY											
2N6246	S	P			AP	125	C	105	R		20	7.0 A	10			3/
2N6247	S	P			AP	125	C	85	R		20	6.0 A	10			3/
2N6248	S	P			AP	125	C	65	R		20	5.0 A	10			3/
2N6249	S	N			SP	100	C	225	X		10	10 A	2.5 T		200/45	
2N6250	S	N			SP	100	C	300	X		8.0	10 A	2.5 T		200/45	
2N6251	S	N			SP	100	C	375	X		6.0	10 A	2.5 T		200/45	
★2N6253	S	N		2N6253	AP	115	C	45	0	15	20	3.0 A	0.8 T			3/1
★2N6254	S	N		2N6253	AP	150	C	80	0	15	20	5.0 A	0.8 T			3/1
★2N6255	S	N		2N6255	AHP	5.0	C	18	0	1.0	5.0	250 m		20		39/79
★2N6256	S	N		2N6256	AHP	2.0	C	16	0	0.4	20	.05 A		8.0		/249
★2N6257	S	N		2N6257	AP	150	C	40	0	20	15	8.0 A	0.2 T			/1
2N6258	S	N			AP	250	C	80	0		20	15 A	0.4 T			3/
2N6259	S	N			AP	250	C	150	0		15	8.0 A	0.2 T			3/
2N6260	S	N			AP	29	C	40	0		20	1.5 A	0.8 T			66/
2N6261	S	N			AP	50	C	80	0		25	1.5 A	0.8 T			66/
★2N6262	S	N		2N6262	AP	150	C	150	0	10	20	3.0 A	0.8 T			3/
2N6263	S	N			AP	20	C	120	0		20	0.5 A	3.2 T			66/
2N6264	S	N	2N5051	2N5050	AP	50	C	150	0		20	1.0 A	0.8 T			66/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE TO- No.	Case No.
2N6265	S	N			AHP	7.5	C	50	R					5.0		66/	
2N6266	S	N			AHP	14.8	C	50	R	50				11			
2N6267	S	N			AHP	21	C	50	R					13			
2N6268	S	P			AH	6.25	C	45	R					5.5			
2N6269	S	N			AH			45	R					5.5			
2N6270	S	N			AP	150	C	80	0	30	20	15 A				3/	
2N6271	S	N			AP	150	C	100	0	30	20	15 A				3/	
2N6272	S	N			AP	150	C	80	0	30	20	15 A				63/	
2N6273	S	N			AP	150	C	100	0	30	20	15 A				63/	
★2N6274	S	N		2N6274	SP	250	C	100	0	50	30	20 A	30 T	600			/197
★2N6275	S	N		2N6274	SP	250	C	120	0	50	30	20 A	30 T	600			/197
★2N6276	S	N		2N6274	SP	250	C	140	0	50	30	20 A	30 T	600			/197
★2N6277	S	N		2N6274	SP	250	C	150	0	50	30	20 A	30 T	600			/197
★2N6278	S	N		2N6278	SP	250	C	100	0	50	30	20 A	30 T	600			/188
★2N6279	S	N		2N6278	SP	250	C	120	0	50	30	20 A	30 T	600			/188
★2N6280	S	N		2N6278	SP	250	C	140	0	50	30	20 A	30 T	600			/188
★2N6281	S	N		2N6278	SP	250	C	150	0	50	30	20 A	30 T	600			/188
★2N6282	S	N		2N6282	AP	160	C	60	0	20	750	10 A	4.0 T	400			/11
★2N6283	S	N		2N6282	AP	160	C	80	0	20	750	10 A	4.0 T	400			/11
★2N6284	S	N		2N6282	AP	160	C	100	0	20	750	10 A	4.0 T	400			/11
★2N6285	S	P		2N6282	AP	160	C	60	0	20	750	10 A	4.0 T	600			/11
★2N6286	S	P		2N6282	AP	160	C	80	0	20	750	10 A	4.0 T	600			/11
★2N6287	S	P		2N6282	AP	160	C	100	0	20	750	10 A	4.0 T	600			/11
2N6288	S	N			AP	16	C	40	0	7.0	30	3.0 A		250		220AB/	
2N6289	S	N			AP	16	C	40	0	7.0	30	3.0 A		250		220AA/	
2N6290	S	N			AP	16	C	60	0	7.0	30	2.5 A		250		220AB/	
2N6291	S	N			AP	16	C	60	0	7.0	30	2.5 A		250		220AB/	
2N6292	S	N			AP	16	C	80	0	7.0	30	2.0 A		250		220AB/	
2N6293	S	N			AP	16	C	80	0	7.0	30	2.0 A		250		220AA/	
★2N6294	S	N		2N6294	AP	50	C	60	0	4.0	750	2.0 A	4.0 T	120		66/	80
★2N6295	S	N		2N6294	AP	50	C	80	0	4.0	750	2.0 A	4.0 T	120		66/	80
★2N6296	S	P		2N6294	AP	50	C	60	0	4.0	750	2.0 A	4.0 T	200		66/	80
★2N6297	S	P		2N6294	AP	50	C	80	0	4.0	750	2.0 A	4.0 T	200		66/	80
★2N6298	S	P		2N6053	AP	75	C	60	0	8.0	750	4.0 A	4.0 T	300		66/	80
★2N6299	S	P		2N6053	AP	75	C	80	0	8.0	750	4.0 A	4.0 T	300		66/	80
★2N6300	S	N		2N6053	AP	75	C	60	0	8.0	750	4.0 A	4.0 T	200		66/	80
★2N6301	S	N		2N6053	AP	75	C	80	0	8.0	750	4.0 A	4.0 T	200		66/	80
★2N6302	S	N		2N6302	AP	150	C	120	0	16	15	8.0 A	0.2 T				/1
★2N6303	S	P		2N3719	SH	1.0	C	80	0	3.0	30	1.5 A	60 T	120		5/	31
★2N6304	S	N		2N6304	A	0.2	C	15	0	.05	25	2.0 m	1400 T			72/	20
★2N6305	S	N		2N6304	A	0.2	C	15	0	.05	25	2.0 m	1200 T			72/	20
★2N6306	S	N		2N6306	SP	125	C	250	0	8.0	15	3.0 A	5.0 T	250			/11
★2N6307	S	N		2N6306	SP	125	C	300	0	8.0	15	3.0 A	5.0 T	250			/11
★2N6308	S	N		2N6306	SP	125	C	350	0	8.0	12	3.0 A	5.0 T	250			/11
★2N6312	S	P		2N6312	AP	75	C	40	0	5.0	25	1.5 A	4.0 T	300		66/	80
★2N6313	S	P		2N6312	AP	75	C	60	0	5.0	25	1.5 A	4.0 T	300		66/	80
★2N6314	S	P		2N6312	AP	75	C	80	0	5.0	25	1.5 A	4.0 T	300		66/	80
★2N6315	S	N		2N5871	AP	90	C	60	0	7.0	4.0	7.0 A	4.0 T	200		66/	80
★2N6316	S	N		2N5871	AP	90	C	80	0	7.0	4.0	7.0 A	4.0 T	200		66/	80
★2N6317	S	P		2N5871	AP	90	C	60	0	7.0	4.0	7.0 A	4.0 T	300		66/	80
★2N6318	S	P		2N5871	AP	90	C	80	0	7.0	4.0	7.0 A	4.0 T	300		66/	80
2N6322	S	N			AP	200	C	200	0	30	6.0	30 A	10 T			3/	
2N6323	S	N			AP	200	C	300	0	30	6.0	30 A	10 T			3/	
2N6324	S	N			AP	200	C	200	0	30	6.0	30 A	10 T			3/	
2N6325	S	N			AP	200	C	300	0	30	6.0	30 A	10 T			3/	
2N6326	S	N			AP	114	C	60	0	30	6.0	30 A	3.0 T			3/	
2N6327	S	N			AP	114	C	80	0	30	6.0	30 A	3.0 T			3/	
2N6328	S	N			AP	114	C	100	0	30	6.0	30 A	3.0 T			3/	
2N6329	S	P			AP	114	C	60	0	30	6.0	30 A	3.0 T			3/	
2N6330	S	P			AP	114	C	80	0	30	6.0	30 A	3.0 T			3/	
2N6331	S	P			AP	114	C	100	0	30	6.0	30 A	3.0 T			3/	
2N6332				TABLE7	THY												
THRU																	
2N6337				TABLE7	THY												
★2N6338	S	N		2N6338	SP	200	C	100	0	25	30	10 A	40 T	300		3/	11
★2N6339	S	N		2N6338	SP	200	C	120	0	25	30	10 A	40 T	300		3/	11
★2N6340	S	N		2N6338	SP	200	C	140	0	25	30	10 A	40 T	300		3/	11
★2N6341	S	N		2N6338	SP	200	C	150	0	25	30	10 A	40 T	300		3/	11
2N6342,A				TABLE7	THY												
THRU																	

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
2N6349,A				TABLE7	THY											
2N6350	S	N			SP	5.0	C	80	R	5.0	2000	5.0 A	50 T	40		33/
2N6351	S	N			SP	5.0	C	150	R	10	1000	5.0 A	50 T	40		33/
2N6352	S	N			SP	5.0	C	80	R	5.0	2000	5.0 A	50 T	40		33/
2N6353	S	N			SP	5.0	C	150	R	10	1000	5.0 A	50 T	40		33/
2N6354	S	N			SP	80	C	130	X	10	20	5.0 A	80 T			3/
★2N6355	S	N		2N6355	AP	150	C	40	0	20	500	4.0 A	0.004 T	600		/1
★2N6356	S	N		2N6355	AP	150	C	40	0	20	1500	4.0 A	0.004 T	600		/1
★2N6357	S	N		2N6355	AP	150	C	60	0	20	500	4.0 A	0.004 T	600		/1
★2N6358	S	N		2N6355	AP	150	C	60	0	20	1500	4.0 A	0.004 T	600		/1
★2N6359	S	N		2N6359	AP	150	C	80	0	16	15	8.0 A	4.0 T			/11
★2N6360	S	N		2N6359	AP	150	C	100	0	12	15	6.0 A	4.0 T			/11
2N6361	S	N			AP	50	C	33	0					35		
2N6362	S	N			AP	100	C	33	0					70		
2N6363	S	N			AP	175	C	33	0					190		
2N6364	S	N			AP	175	C	33	0					190		
2N6365	G	P			A	0.15	A	10	0		20	0.1 m	200 T			18/
2N6365A	G	P			A	0.15	A	10	0		20	0.1 m	200 T			18/
★2N6366	S	N		2N6366	AP	10	C	18	0	1.0	5.0	.25 A	50 T	20		102/24
★2N6367	S	N		2N6367	AH	20	C	18	0	2.0	5.0	0.5 A	50 T	90		/211
★2N6368	S	N		2N6368	AH	140	C	20	0	8.0	10	1.0 A	50 T	350		/211
2N6369	S	N			AP	220	C	35	0					225		
★2N6370	S	N		2N6370	AP	20	C	35	0	1.5	5.0	0.5 A	50 T	40		/211
2N6371	S	N			AP	66.7	C	50	X	16	15	8.0 A				66/
2N6372	S	N			AP	22.8	C	90	X	6.0	20	2.0 A				66/
2N6373	S	N			AP	22.8	C	70	X	6.0	20	2.5 A				66/
2N6374	S	N			AP	22.8	C	50	X	6.0	20	3.0 A				66/
★2N6377	S	P		2N6377	SP	250	C	80	0	50	30	20 A	30 T	1500	350/1050	
★2N6378	S	P		2N6377	SP	250	C	100	0	50	30	20 A	30 T	1500	350/1050	
★2N6379	S	P		2N6377	SP	250	C	120	0	50	30	20 A	30 T	1500	350/1050	
★2N6380	S	P		2N6380	SP	250	C	80	0	50	30	20 A	30 T	1500	350/1050	63/
★2N6381	S	P		2N6380	SP	250	C	100	0	50	30	20 A	30 T	1500	350/1050	63/
★2N6382	S	P		2N6380	SP	250	C	120	0	50	30	20 A	30 T	1500	350/1650	63/
2N6383	S	N			AP	100	C	40	X	10	1000	5.0 A	20 T	200		3/
2N6384	S	N			AP	100	C	60	X	10	1000	5.0 A	20 T	200		3/
2N6385	S	N			AP	100	C	80	X	10	1000	5.0 A	20 T	200		3/
2N6386	S	N			AP	40	C	40	X	8.0	1000	3.0 A	20 T	200		220AB/
2N6387	S	N			AP	40	C	80	X	10	1000	5.0 A	20 T	200		220AB/
2N6388	S	N			AP	40	C	80	X	10	1000	5.0 A	20 T	200		220AB/
2N6389	S	N			A	0.2	A	12	0	0.04	25	3.0 m	1000 T			72/20
2N6390	S	N			A	8.34	C	50	R	1.0	20	50 m		5.0		
2N6391	S	N			A	8.34	C	50	R	2.5	20	50 m		9.0		
2N6392	S	N			A	8.34	C	50	R	4.0	20	50 m		11		
2N6393	S	N			A	8.34	C	50	R	4.0	20	50 m		11		
2N6394				TABLE7	THY											
THRU																
2N6405				TABLE7	THY											
2N6406	S	P			AP	12.5	C	60	0	2.0	50	100 m	50 T	50		
2N6407	S	P			AP	12.5	C	80	0	2.0	50	100 m	50 T	50		
2N6408	S	N			AP	12.5	C	60	0	2.0	50	100 m	50 T	30		
2N6409	S	N			AP	12.5	C	80	0	2.0	50	100 m	50 T	30		
2N6410	S	N			AP	15	C	25	0	4.0	45	2.0 A	50 T	80		
2N6411	S	P			AP	15	C	25	0	4.0	45	2.0 A	50 T	120		
2N6412	S	N			AP	15	C	40	0	4.0	40	200 m	50 T	50		
2N6413	S	N			AP	15	C	60	0	4.0	40	200 m	50 T	50		
2N6414	S	P			AP	15	C	40	0	4.0	40	200 m	50 T	70		
2N6415	S	P			AP	15	C	60	0	4.0	40	200 m	50 T	70		
2N6416	S	N			AP	15	C	80	0	3.0	40	200 m	40 T	50		
2N6417	S	N			AP	15	C	100	0	3.0	40	200 m	40 T	50		
2N6436	S	P			SP	200	C	80	0	25	20	10 A	40 T	700	300/1250	3/
2N6437	S	P			SP	200	C	100	0	25	20	10 A	40 T	700	300/1250	3/
2N6438	S	P			SP	200	C	120	0	25	20	10 A	40 T	700	300/1250	3/
2N6449				TABLE8	FET											
2N6455	S	N			AP	60	C	25	0	7.0	10	2.0 A	75 T	90		
2N6456	S	N			AP	75	C	25	0	12	10	4.0 A	60 T	180		
2N6457	S	N			AP	140	C	25	0	20	10	4.0 A	50 T	360		
2N6458	S	N			AP	75	C	25	0	7.0	10	2.0 A	75 T	90		
2N6459	S	N			AP	120	C	25	0	12	10	4.0 A	60 T	180		
2N6460	S	N			AP	140	C	25	0	20	10	4.0 A	50 T	360		
2N6461	S	N			A	1.0	A	300	0	0.1	30	20 m	20 T	70		39/

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No.	Case No.
2N6462	S	N			A	1.0	A	300	0	0.1	100	20 m	20 T	70		39/	
2N6463	S	N			A	1.0	A	250	0	0.1	30	20 m	20 T	70		39/	
2N6464	S	N			A	1.0	A	250	0	0.1	100	20 m	20 T	70		39/	
3N22		N			AH			15	B								
3N34	S	N				0.125		30	B								
3N35	S	N				0.125		30	0								
3N35A	S	N				0.125		30	0							12/	
3N39				TABLE5	R-A												
THRU																	
3N44				TABLE5	R-A												
3N45	G	P			SP	75	C	35			30	5.0 A	0.6 T			15/	
3N46	G	P			SP	75	C	50			20	5.0 A	0.3 T			15/	
3N47	G	P			SP	75	C	25			30	5.0 A	0.5 T				
3N48	G	P			SP	75	C	40			20	5.0 A	0.3 T				
3N49	G	P			SP	94	C	35			30	5.0 A	0.6 T				
3N50	G	P			SP	94	C	50			20	5.0 A	0.3 T				
3N51	G	P			SP	94	C	25			30	5.0 A	0.5 T				
3N52	G	P			SP	94	C	40			20	5.0 A	0.3 T				
3N58				TABLE7	THY												
THRU																	
3N60				TABLE7	THY												
3N62	S	N			SC			10	B								
3N63	S	N			SC			10	B								
3N64	S	N			SC			10	B								
3N65	S	N			SC												
3N66	S	N			SC												
3N67	S	N			SC												
3N68	S	N			SC			10	B								
3N68A	S	N				0.1	A	10	B								
3N69	S	N			SC			10	B								
3N70	S	N			SC			10	B								
3N71	S	N			SC	0.1		8.0	0		40	2.0 m	100 T				
3N72	S	N			SC	0.1		8.0	0		40	2.0 m	100 T				
3N73	S	N			SC	0.1		8.0	0		40	2.0 m	100 T				
3N74	S	N			SC	0.3		50	B				30 T				
3N75	S	N			SC	0.3		50	B				30 T				
3N76	S	N			SC	0.3		50	B				30 T				
3N77	S	N			SC	0.3		40	B				30 T				
3N78	S	N			SC	0.2		40	B				30 T				
3N79	S	N			SC	0.3		40	B				30 T				
3N80				TABLE7	THY												
THRU																	
3N86				TABLE7	THY												
3N87	S	N			SC	0.2	A	10	0		5.0	0.5 m	100 T				
3N88	S	N			SC	0.2	A	10	0		5.0	0.5 m	100 T				
3N89				TABLE8	FET												
3N90	S	P			SC	0.3	A	50	B				6.0 T				
3N91	S	P			SC	0.3	A	50	B				6.0 T				
3N92	S	P			SC	0.3	A	50	B				6.0 T				
3N93	S	P			SC	0.3	A	50	B				6.0 T				
3N94	S	P			SC	0.3	A	50	B				6.0 T				
3N95	S	P			SC	0.3	A	50	B				6.0 T				
3N96																	
THRU				TABLE8	FET												
3N99																	
3N100	S	P			SC	0.3	A	20	B								
3N101	S	P			SC	0.3	A	30	B								
3N102	S	P			SC	0.3	A	40	B								
3N103	S	P			SC	0.3	A	50	B								
3N104	S	P			SC	0.3	A	60	B								
3N105	S	P			SC	0.3	A	20	B								
3N106	S	P			SC	0.3	A	40	B								
3N107	S	P			SC	0.3	A	60	B								
3N108	S	P			SC	0.3	A	50	B				12 T				
3N109	S	P			SC	0.3	A	50	B				12 T				
3N110	S	P			SC	0.3	A	50	B				12 T				
3N111	S	P			SC	0.3	A	50	B				12 T				
3N112	S	P			SC	0.2	A	50	B								
3N113	S	P			SC	0.2	A	50	B				12 T				
3N114	S	P			SC	0.3	A	30	B				12 T				

TYPE NO.	MATERIAL	POLARITY	REPLACEMENT	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No.	Case No.
3N115	S	P			SC	0.3	A	30	B				12 T				
3N116	S	P			SC	0.3	A	30	B				12 T				
3N117	S	P			SC	0.3	A	50	B				12 T				
3N118	S	P			SC	0.3	A	50	B				12 T				
3N119	S	P			SC	0.3	A	50	B				12 T				
3N120	S	N			SC	0.2	A	30	B								
3N121	S	N			SC	0.2	A	30	B				40				
3N123	S	P			SC	0.1	A	30	B								
3N124				TABLE8	FET												
THRU																	
3N126				TABLE8	FET												
3N127	S	N			SC	200M	A	20	0								
3N128				TABLE8	FET												
3N129	S	P			SC	0.3	A	20	B	0.02				10		72/	
3N130	S	P			SC	0.3	A	30	B	0.02				10		72/	
3N131	S	P			SC	0.3	A	40	B	0.02				10		72/	
3N132	S	P			SC	0.3	A	50	B	0.02				10		72/	
3N133	S	P			SC	0.3	A	60	B	0.02				10		72/	
3N134	S	P			SC	0.3	A	20	B	0.02				12		72/	
3N135	S	P			SC	0.3	A	40	B	0.02				12		72/	
3N136	S	P			SC	0.3	A	60	B	0.02				12		72/	
3N138				TABLE8	FET												
THRU																	
3N143				TABLE8	FET												
3N145				TABLE8	FET												
THRU																	
3N186				TABLE8	FET												
3N188				TABLE8	FET												
3N191				TABLE8	FET												
3N192				TABLE8	FET												
3N193				TABLE8	FET												
THRU																	
3N206				TABLE8	FET												
3N207				TABLE8	FET												
3N208				TABLE8	FET												
3N211				TABLE8	FET												
THRU																	
3N213				TABLE8	FET												
3N214				TABLE8	FET												
THRU																	
3N218				TABLE8	FET												
4N22				TABLE6	OPT												
THRU																	
4N24				TABLE6	OPT												
4N25				TABLE6	OPT												
THRU																	
4N28				TABLE6	OPT												
4N29				TABLE6	OPT												
THRU																	
4N33				TABLE6	OPT												

TABLE 5 - REFERENCE AMPLIFIER INDEX

This table contains a numerical listing and short-form specifications for reference amplifiers with EIA-registered 3N numbers. In addition, short-form specifications are also provided for special house numbered reference amplifiers.

KEY

TYPE	REFERENCE	V_{REF} Volts	Tol ±%	$\triangle V_{REF}$ Volts *TC %/°C	I_{ZT} mA	Z_{ZT} Ohms	T_1 °C	T_2 °C
Numerical Listing of Registered Type Numbers	First type number on data sheet where the EIA type or replacement part is located.	Nominal Reference Voltage	Tolerance of Nominal Reference Voltage	Maximum Voltage Variation over the Temperature Range from T1 to T2 *Temperature Coefficient $\frac{\Delta V_{REF}}{V_{REF}\,(T2-T1)} \times 100$	Zener Test Current	Maximum Zener Impedance	Temperature Range over which ΔV_{ref} is specified *Maximum Operating Temperature	

REFERENCE AMPLIFIER INDEX

TYPE	REFERENCE	V_{REF} Volts	Tol ±%	$\triangle V_{REF}$ Volts *TC %/°C	I_{ZT} mA	Z_{ZT} Ohms	T_1 °C	T_2 °C
3N39		9.0	9.0	0.005*	5.0			71*
3N40		9.0	9.0	0.003*	5.0			71*
3N41		9.0	9.0	0.002*	5.0			71*
3N42		9.0	9.0	0.005*	5.0			100*
3N43		9.0	9.0	0.003*	5.0			100*
3N44		9.0	9.0	0.002*	5.0			100*
3N44A		9.0	10	0.001*	5.0			150*
MCA1911	MCA1911	6.8	10	0.051	5.0	40	0	75
MCA1912	MCA1911	6.8	10	0.025	5.0	40	0	75
MCA1913	MCA1911	6.8	10	0.010	5.0	40	0	75
MCA1914	MCA1911	6.8	10	0.005	5.0	40	0	75
MCA1921	MCA1911	6.8	5.0	0.105	5.0	40	-55	100
MCA1922	MCA1911	6.8	5.0	0.052	5.0	40	-55	100
MCA1923	MCA1911	6.8	5.0	0.020	5.0	40	-55	100
MCA1924	MCA1911	6.8	5.0	0.010	5.0	40	-55	100
MCA1931	MCA1911	6.8	5.0	0.139	5.0	40	-55	150
MCA1932	MCA1911	6.8	5.0	0.069	5.0	40	-55	150
MCA1933	MCA1911	6.8	5.0	0.026	5.0	40	-55	150
MCA1934	MCA1911	6.8	5.0	0.013	5.0	40	-55	150
MCA2011	MCA1911	8.6	10	0.060	5.0	40	0	75
MCA2012	MCA1911	8.6	10	0.030	5.0	40	0	75
MCA2013	MCA1911	8.6	10	0.012	5.0	40	0	75
MCA2014	MCA1911	8.6	10	0.006	5.0	40	0	75
MCA2021	MCA1911	8.6	5.0	0.124	5.0	40	-55	100
MCA2022	MCA1911	8.6	5.0	0.062	5.0	40	-55	100
MCA2023	MCA1911	8.6	5.0	0.024	5.0	40	-55	100
MCA2024	MCA1911	8.6	5.0	0.012	5.0	40	-55	100
MCA2031	MCA1911	8.6	5.0	0.164	5.0	40	-55	150
MCA2032	MCA1911	8.6	5.0	0.082	5.0	40	-55	150
MCA2033	MCA1911	8.6	5.0	0.032	5.0	40	-55	150
MCA2034	MCA1911	8.6	5.0	0.016	5.0	40	-55	150
MCA2111	MCA1911	9.5	10	0.071	5.0	40	0	75
MCA2112	MCA1911	9.5	10	0.035	5.0	40	0	75
MCA2113	MCA1911	9.5	10	0.014	5.0	40	0	75
MCA2114	MCA1911	9.5	10	0.007	5.0	40	0	75
MCA2121	MCA1911	9.5	5.0	0.147	5.0	40	-55	100
MCA2122	MCA1911	9.5	5.0	0.073	5.0	40	-55	100
MCA2123	MCA1911	9.5	5.0	0.028	5.0	40	-55	100
MCA2124	MCA1911	9.5	5.0	0.014	5.0	40	-55	100
MCA2131	MCA1911	9.5	5.0	0.194	5.0	40	-55	150
MCA2132	MCA1911	9.5	5.0	0.097	5.0	40	-55	150
MCA2133	MCA1911	9.5	5.0	0.038	5.0	40	-55	150
MCA2134	MCA1911	9.5	5.0	0.019	5.0	40	-55	150
MCA2211	MCA1911	11.0	10	0.082	5.0	40	0	75
MCA2212	MCA1911	11.0	10	0.041	5.0	40	0	75
MCA2213	MCA1911	11.0	10	0.016	5.0	40	0	75
MCA2214	MCA1911	11.0	10	0.008	5.0	40	0	75
MCA2221	MCA1911	11.0	5.0	0.170	5.0	40	-55	100
MCA2222	MCA1911	11.0	5.0	0.085	5.0	40	-55	100
MCA2223	MCA1911	11.0	5.0	0.034	5.0	40	-55	100
MCA2224	MCA1911	11.0	5.0	0.017	5.0	40	-55	100
MCA2231	MCA1911	11.0	5.0	0.225	5.0	40	-55	150
MCA2232	MCA1911	11.0	5.0	0.112	5.0	40	-55	150
MCA2233	MCA1911	11.0	5.0	0.044	5.0	40	-55	150
MCA2234	MCA1911	11.0	5.0	0.022	5.0	40	-55	150

TABLE 7 - THYRISTOR INDEX

This table contains a numerical listing and short-form specifications for thyristors with EIA-registered 2N and 3N numbers. Specific types of thyristors listed include silicon controlled rectifiers, gate-controlled switches, and triacs.

KEY

TYPE	REPLACE-MENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
Numerical Listing of Registered Type Numbers. *Devices with gate turn-off characteristics ***Available from Motorola**	Type number of recommended replacement or of nearest electrical equivalent	First type number on data sheet where the EIA type or replacement part is located.	On-State (RMS) Current	Peak Forward Blocking Voltage Peak Reverse Blocking Voltage	Maximum Junction Temperature	Gate Trigger Current	Gate Trigger Voltage

TYPE	REPLACEMENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
★2N681		2N681	25	25	125	40	2.0
★2N681A		2N681	28	25	125	40	2.0
★2N682		2N681	25	50	125	40	2.0
★2N682A		2N681	28	50	125	40	2.0
★2N683		2N681	25	100	125	40	2.0
★2N683A		2N681	28	100	125	40	2.0
★2N684		2N681	25	150	125	40	2.0
★2N684A		2N681	28	150	125	40	2.0
★2N685		2N681	25	200	125	40	2.0
★2N685A		2N681	28	200	125	40	2.0
★2N686		2N681	25	250	125	40	2.0
★2N686A		2N681	28	250	125	40	2.0
★2N687		2N681	25	300	125	40	2.0
★2N687A		2N681	28	300	125	40	2.0
★2N688		2N681	25	400	125	40	2.0
★2N688A		2N681	28	400	125	40	2.0
★2N689		2N681	25	500	125	40	2.0
★2N689A		2N681	28	500	125	40	2.0
★2N690		2N681	25	600	125	40	2.0
★2N690A		2N681	25	600	125	40	2.0
2N691			25	700	125	40	2.0
2N692			25	800	125	40	2.0
2N764*			0.39	30	125	1.0	1.0
2N765*			0.20	60	125	1.0	1.0
2N766*			0.20	100	125	1.0	1.0
2N767*			0.20	200	125	1.0	1.0
2N876	2N4212	2N4212	0.35	15	150	0.2	0.8
2N877	2N4212	2N4212	0.35	30	150	0.2	0.8
2N878	2N4213	2N4212	0.35	60	150	0.2	0.8
2N879	2N4214	2N4212	0.35	100	150	0.2	0.8
2N880	2N4215	2N4212	0.35	150	150	0.2	0.8
2N881	2N4216	2N4212	0.35	200	150	0.2	0.8
2N882			0.35	300	150	0.2	0.8
2N883			0.35	400	150	0.2	0.8
2N884	2N4212	2N4212	0.35	15	150	0.02	0.6
2N885	2N4213	2N4212	0.35	30	150	0.02	0.6
2N886	2N4214	2N4212	0.35	60	150	0.02	0.6
2N887	2N4214	2N4212	0.35	100	150	0.02	0.6
2N888	2N4215	2N4212	0.35	150	150	0.02	0.6
2N889	2N4216	2N4212	0.35	200	150	0.02	0.6
2N890			0.35	300	150	0.02	0.6
2N891			0.35	400	150	0.02	0.6
2N892*			0.250	15	125	0.05	0.70
2N893*			0.250	15	125	0.05	0.70
2N894*			0.250	30/15	125	0.05	0.70
2N895*			0.250	30/15	125	0.05	0.70
2N896*			0.250	60/15	125	0.05	0.70
2N897*			0.250	60/15	125	0.05	0.70
2N898*			0.250	100/15	125	0.05	0.70
2N899*			0.250	100/15	125	0.05	0.70
2N900*			0.250	200/15	125	0.05	0.70
2N901*			0.250	200/15	125	0.05	0.70
2N948	2N4212	2N4212	0.26	30	150	0.02	1.0
2N949	2N4213	2N4212	0.26	60	150	0.02	1.0
2N950	2N4214	2N4212	0.26	100	150	0.02	1.0
2N951	2N4215	2N4212	0.26	200	150	0.02	1.0
2N1213			0.1	25	71	0.5	0.4
2N1214			0.1	25	71	1.0	0.4
2N1215			0.1	25	71	1.5	0.4
2N1216			0.1	25	71	5.0	0.4
★2N1595		2N1595	1.6	50	125	10	3.0
★2N1595A		2N1595	1.6	50	150	2.0	2.0
★2N1596		2N1595	1.6	100	125	10	3.0
★2N1596A		2N1595	1.6	100	150	2.0	2.0
★2N1597		2N1595	1.6	200	125	10	3.0
★2N1597A		2N1595	1.6	200	150	2.0	2.0
★2N1598		2N1595	1.6	300	125	10	3.0
★2N1598A		2N1595	1.6	300	150	2.0	2.0
★2N1599		2N1595	1.6	400	125	10	3.0
★2N1599A		2N1595	1.6	400	150	2.0	2.0

2N1600-2N1849B

TYPE	REPLACE-MENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
2N1600	2N4168	2N4151	4.0	50	125	10	3.0
2N1600A	2N4168	2N4151	4.0	50	125	4.5	3.0
2N1601	2N4169	2N4151	4.0	100	125	10	3.0
2N1602	2N4170	2N4151	4.0	200	125	10	3.0
2N1603	2N4171	2N4151	4.0	300	125	10	3.0
2N1604	2N4172	2N4151	4.0	400	125	10	3.0
2N1686*			0.5	30	125	1.0	1.0
2N1687*			0.5	60	125	1.0	1.0
2N1688*			0.5	100	125	1.0	1.0
2N1689*			0.5	200	125	1.0	1.0
2N1765			0.5	400	85	10	1.5
2N1770	2N4167	2N4151	4.7	25	125	15	2.0
2N1770A			4.7	25	150	15	2.0
2N1771	2N4168	2N4151	4.7	50	125	15	2.0
2N1771A			4.7	50	150	15	2.0
2N1772	2N4169	2N4151	4.7	100	125	15	2.0
2N1772A			4.7	100	150	15	2.0
2N1773	2N4170	2N4151	4.7	150	125	15	2.0
2N1773A			4.7	150	150	15	2.0
2N1774	2N4170	2N4151	4.7	200	125	15	2.0
2N1774A			4.7	200	150	15	2.0
2N1775	2N4171	2N4151	4.7	250	125	15	2.0
2N1775A			4.7	250	150	15	2.0
2N1776	2N4171	2N4151	4.7	300	125	15	2.0
2N1776A			4.7	300	150	15	2.0
2N1776B			4.7	300	150	15	2.0
2N1777	2N4172	2N4151	4.7	400	125	15	2.0
2N1777A			7.0	400	150	15	2.0
2N1778	2N4173	2N4151	7.4	500	125	15	2.0
2N1778A			7.0	500	150	15	2.0
2N1792			110	60	125	75	3.0
2N1793			110	120	125	75	3.0
2N1794			110	180	125	75	3.0
2N1795			110	240	125	75	3.0
2N1796			110	300	125	75	3.0
2N1797			110	360	125	75	3.0
2N1798			110	480	125	75	3.0
2N1799			110	600	125	75	3.0
2N1800			110	720	125	75	3.0
2N1801			110	840	125	75	3.0
2N1802			110	960	125	75	3.0
2N1803			110	1080	125	90	3.0
2N1804			110	1200	125	90	3.0
2N1805			110	500	125	75	3.0
2N1806			110	600	125	75	3.0
2N1807			110	700	125	75	3.0
★2N1842		2N1842	16	25	100	80	2.0
★2N1842A		2N1842A	16	25	125	80	2.0
2N1842B	2N1842A	2N1842A	20	25	125	75	3.0
★2N1843		2N1842	16	50	100	80	2.0
★2N1843A		2N1842A	16	50	125	80	2.0
2N1843B	2N1843A	2N1842A	20	50	125	75	3.0
★2N1844		2N1842	16	100	100	80	2.0
★2N1844A		2N1842A	16	100	125	80	2.0
2N1844B	2N1844A	2N1842A	20	100	125	75	3.0
★2N1845		2N1842	16	150	100	80	2.0
★2N1845A		2N1842A	16	150	125	80	2.0
2N1845B	2N1845A	2N1842A	20	150	125	75	3.0
★2N1846		2N1842	16	200	100	80	2.0
★2N1846A		2N1842A	16	200	125	80	2.0
2N1846B	2N1846A	2N1842A	20	200	125	75	3.0
★2N1847		2N1842	16	250	100	80	2.0
★2N1847A		2N1842A	16	250	125	80	2.0
2N1847B	2N1847A	2N1842A	20	250	125	75	3.0
★2N1848		2N1842	16	300	100	80	2.0
★2N1848A		2N1842A	16	300	125	80	2.0
2N1848B	2N1848A	2N1842A	20	300	125	75	3.0
★2N1849		2N1842	16	400	100	80	2.0
★2N1849A		2N1842A	16	400	125	80	2.0
2N1849B	2N1849A	2N1842A	20	400	125	75	3.0

TYPE	REPLACEMENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
★2N1850		2N1842	16	500	100	80	2.0
★2N1850A		2N1842A	16	500	125	80	2.0
2N1850B	2N1850A	2N1842A	20	500	125	75	3.0
2N1869	2N4212	2N4212	1.25	15	150	0.2	0.8
2N1869A			1.25	15	150	0.2	0.8
2N1870	2N4213	2N4212	1.25	30	150	0.2	0.8
2N1870A			1.25	30	150	0.2	0.8
2N1871	2N4214	2N4212	1.25	60	150	0.2	0.8
2N1871A			1.25	60	150	0.2	0.8
2N1872	2N4214	2N4212	1.25	100	150	0.2	0.8
2N1872A			1.25	100	150	0.2	0.8
2N1873	2N4215	2N4212	1.25	150	150	0.2	0.8
2N1873A			1.25	150		0.2	0.8
2N1874	2N4216	2N4212	1.25	200	150	0.2	0.8
2N1874A			1.25	200	150	0.2	0.8
2N1875	2N4212	2N4212	1.25	15	150	0.020	0.6
2N1875A			1.25	15	150	0.020	0.6
2N1876	2N4213	2N4212	1.25	30	150	0.020	0.6
2N1876A			1.25	30	150	0.020	0.6
2N1877	2N4214	2N4212	1.25	60	150	0.020	0.6
2N1877A			1.25	60	150	0.020	0.6
2N1878	2N4214	2N4212	1.25	100	150	0.020	0.6
2N1878A			1.25	100	150	0.020	0.6
2N1879	2N4215	2N4212	1.25	150	150	0.020	0.6
2N1879A			1.25	150	150	0.020	0.6
2N1880	2N4216	2N4212	1.25	200	150	0.020	0.6
2N1880A			1.25	200	150	0.020	0.6
2N1881	2N4212	2N4212	1.0	30	150	2.0	2.0
2N1882	2N4213	2N4212	1.0	60	150	2.0	2.0
2N1883	2N4214	2N4212	1.0	100	150	2.0	2.0
2N1884	2N4215	2N4212	1.0	150	150	2.0	2.0
2N1885	2N4216	2N4212	1.0	200	150	2.0	2.0
2N1909			70	25	125	75	3.0
2N1910			70	50	125	75	3.0
2N1911			70	100	125	75	3.0
2N1912			70	150	125	75	3.0
2N1913			70	200	125	75	3.0
2N1914			70	250	125	75	3.0
2N1914A			70	250	125	75	3.0
2N1914B			70	250	125	75	3.0
2N1915			70	300	125	75	3.0
2N1916			70	400	125	75	3.0
2N1929	2N4191	2N4151	0.75	25	125	15	2.0
2N1930	2N4192	2N4151	0.75	50	125	15	2.0
2N1931	2N4193	2N4151	0.75	100	125	15	2.0
2N1932	2N4194	2N4151	0.75	150	125	15	2.0
2N1933	2N4194	2N4151	0.75	200	125	15	2.0
2N1934	2N4195	2N4151	0.75	250	125	15	2.0
2N1935	2N4195	2N4151	0.75	300	125	15	2.0
2N2009	2N4212	2N4212	1.3	25	150	0.2	1.0
2N2010	2N4213	2N4212	1.3	50	150	0.2	1.0
2N2011	2N4214	2N4212	1.3	100	150	0.2	1.0
2N2012	2N4216	2N4212	1.3	200	150	0.2	1.0
2N2013			1.3	300	150	0.2	1.0
2N2014			1.3	400	150	0.2	1.0
2N2023	2N2023		70	25	150	75	3.0
2N2024	2N2024		70	50	150	75	3.0
2N2025	2N2025		70	100	150	75	3.0
2N2026	2N2026		70	150	150	75	3.0
2N2027	2N2027		70	200	150	75	3.0
2N2028	2N2028		70	250	150	75	3.0
2N2029	2N2029		70	300	150	75	3.0
2N2030			70	400	150	75	3.0
2N2031			110	50	125	75	3.0
2N2044			150	200	125	80	3.0
2N2045			150	300	125	80	3.0
2N2046			150	400	125	80	3.0
2N2047			150	500	125	80	3.0
2N2074	2N4213	2N4212	1.0	50	150	0.2	0.65
2N2260*			200	30	100	0.25	

TYPE	REPLACE-MENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
2N2261*			200	30	100	0.5	
2N2262*			200	30	100	5.0	
★2N2322		2N2322	1.6	25	125	0.2	0.8
2N2322A			1.6	25	125	0.02	0.6
★2N2323		2N2322	1.6	50	125	0.2	0.8
2N2323A			1.6	50	125	0.02	0.6
★2N2324		2N2322	1.6	100	125	0.2	0.8
2N2324A			1.6	100	125	0.02	0.6
★2N2325		2N2322	1.6	150	125	0.2	0.8
2N2325A			1.6	150	125	0.02	0.6
★2N2326		2N2322	1.6	200	125	0.2	0.8
2N2326A			1.6	200	125	0.02	0.6
2N2327			1.6	250	125	0.2	0.8
2N2327A			1.6	250	125	0.02	0.6
2N2328			1.6	300	125	0.2	0.8
2N2328A			1.6	300	125	0.02	0.6
2N2329			1.6	400	125	0.2	0.8
2N2329A			1.6	400	125	0.02	0.6
2N2344	MCR1906-1	MCR1906-1	1.6	25	100	0.02	0.8
2N2345	MCR1906-2	MCR1906-1	1.6	50	100	0.02	0.8
2N2346	MCR1906-3	MCR1906-1	1.6	100	100	0.02	0.8
2N2347	MCR1906-4	MCR1906-1	1.6	150	100	0.02	0.8
2N2348	MCR1906-4	MCR1906-1	1.6	200	100	0.02	0.8
2N2503			225	50	125	100	2.5
2N2504			225	100	125	100	2.5
2N2505			225	200	125	100	2.5
2N2506			225	300	125	100	2.5
2N2507			225	400	125	100	2.5
2N2508			225	500	125	100	2.5
2N2542			230	50	125	125	3.0
2N2543			230	100	125	125	3.0
2N2544			230	200	125	125	3.0
2N2545			230	300	125	125	3.0
2N2546			230	400	125	125	3.0
2N2547			230	500	125	125	3.0
2N2548			230	600	125	125	3.0
2N2549			150	800	125	125	3.0
2N2550			150	1000	125	125	3.0
★2N2573		2N2573	25	25	125	40	3.5
★2N2574		2N2573	25	50	125	40	3.5
★2N2575		2N2573	25	100	125	40	3.5
★2N2576		2N2573	25	200	125	40	3.5
★2N2577		2N2573	25	300	125	40	3.5
★2N2578		2N2573	25	400	125	40	3.5
★2N2579		2N2573	25	500	125	40	3.5
2N2619	2N4174	2N4151	7.4	600	125	45	2.0
2N2653	2N4172	2N4151	3.0	400	105	35	3.0
2N2679			0.35	30	150	0.02	0.7
2N2679A			0.35	30	150	0.02	0.7
2N2680	MCR103	MCR201	0.35	60	150	0.02	0.7
2N2680A			0.35	60	150	0.02	0.7
2N2681	MCR204	MCR201	0.35	100	150	0.02	0.7
2N2681A			0.35	100	150	0.02	0.70
2N2682	MCR206	MCR201	0.35	200	150	0.02	0.7
2N2682A			0.35	200	150	0.02	0.70
2N2683	MCR202	MCR201	0.28	30	125	0.02	0.8
2N2683A			0.28	30	125	0.02	0.80
2N2684	MCR203	MCR201	0.28	60	125	0.02	0.8
2N2684A			0.28	60	125	0.02	0.80
2N2685	MCR204	MCR201	0.28	100	125	0.02	0.8
2N2685A			0.28	100	125	0.02	0.80
2N2686	MCR206	MCR201	0.28	200	125	0.02	0.8
2N2686A			0.28	200	125	0.02	0.80
2N2687	MCR202	MCR201	0.28	30	125	0.2	1.0
2N2688	MCR203	MCR201	0.28	60	125	0.2	1.0
2N2689	MCR204	MCR201	0.28	100	125	0.2	1.0
2N2690	MCR206	MCR201	0.28	200	125	0.2	1.0
2N2888	MCR1907-4	MCR1907-1	25	200	125	40	1.5
2N2889	MCR1907-4	MCR1907	25	250	125	40	1.5
2N3001	MCR202	MCR201	0.35	30	150	0.02	0.7

TYPE	REPLACE-MENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
2N3002	MCR203	MCR201	0.35	60	150	0.02	0.7
2N3003	MCR204	MCR201	0.35	100	150	0.02	0.7
2N3004	MCR206	MCR201	0.35	200	150	0.02	0.7
2N3005	MCR202	MCR201	0.35	30	150	0.2	0.8
2N3006	MCR203	MCR201	0.35	60	150	0.2	0.8
2N3007	MCR204	MCR201	0.35	100	150	0.2	0.8
2N3008	MCR206	MCR201	0.35	200	150	0.2	0.8
2N3027	MCR202	MCR201	0.5	30	150	0.2	0.8
2N3028	MCR203	MCR201	0.5	60	150	0.2	0.8
2N3029	MCR204	MCR201	0.5	100	150	0.2	0.8
2N3030	MCR202	MCR201	0.5	30	150	0.02	0.6
2N3031	MCR203	MCR201	0.5	60	150	0.02	0.6
2N3032	MCR204	MCR201	0.5	100	150	0.02	0.6
2N3091	MCR150-60		110	600	125	70	2.0
2N3092	MCR150-70		110	700	125	70	2.0
2N3093	MCR150-80		110	800	125	70	2.0
2N3094	MCR150-90		110	900	125	70	2.0
2N3095	MCR150-100		110	1000	125	70	2.0
2N3096	MCR150-110		110	1100	125	70	2.0
2N3097	MCR150-120		110	1200	125	70	2.0
2N3098	MCR150-130		110	1300	125	70	2.0
2N3099	MCR150-60		110	600	125	70	2.0
2N3100	MCR150-70		110	700	125	70	2.0
2N3101	MCR150-80		110	800	125	70	2.0
2N3102	MCR150-90		110	900	125	70	2.0
2N3103	MCR150-100		110	1000	125	70	2.0
2N3104	MCR150-110		110	1100	125	70	2.0
2N3105	MCR150-120		110	1200	125	70	2.0
2N3106	MCR150-130		110	1300	125	70	2.0
2N3228	2N4154	2N4151	3.2	200	100	15	2.0
2N3254	MCR202	MCR201	0.25	15	150	0.02	0.75
2N3255	MCR202	MCR201	0.25	30	150	0.02	0.75
2N3256	MCR203	MCR201	0.25	60	150	0.02	0.75
2N3257	MCR202	MCR201	0.25	15	150	0.2	0.75
2N3258	MCR202	MCR201	0.25	30	150	0.2	0.75
2N3259	MCR203	MCR201	0.25	60	150	0.2	0.75
2N3269	2N4169	2N4151	8.0	100	150	0.2	0.8
2N3270	2N4170	2N4151	8.0	200	150	0.2	0.8
2N3271	2N4171	2N4151	8.0	300	150	0.2	0.8
2N3272	2N4171	2N4151	8.0	400	150	0.2	0.8
2N3273			2.2	100	150	0.2	0.8
2N3274			2.2	200	150	0.2	0.8
2N3275			2.2	300	150	0.2	0.8
2N3276			2.2	400	150	0.2	0.8
2N3353			400	50	125	200	4.0
2N3354			400	100	125	200	4.0
2N3355			400	200	125	200	4.0
2N3356			400	300	125	200	4.0
2N3357			400	400	125	200	4.0
2N3358			400	500	125	200	4.0
2N3359			400	600	125	200	4.0
2N3360			400	700	125	200	4.0
2N3361			400	800	125	200	4.0
2N3362			400	900	125	200	4.0
2N3363			400	1000	125	200	4.0
2N3364			400	1200	125	200	4.0
2N3422			196	600	125	150	3.0
2N3525	2N4156	2N4151	3.2	400	100	15	2.0
2N3528	2N4186	2N4151	1.3	200	100	15	2.0
2N3529	2N4188	2N4151	1.3	400	100	15	2.0
2N3530			400	50	125	300	4.0
2N3531			400	100	125	300	4.0
2N3532			400	200	125	300	4.0
2N3533			400	300	125	300	4.0
2N3534			400	400	125	300	4.0
2N3535			400	500	125	300	4.0
2N3536			400	600	125	300	4.0
2N3537			400	700	125	300	4.0
2N3538			400	800	125	300	4.0
2N3539			400	900	125	300	4.0

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2N3540-2N4103

TYPE	REPLACEMENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
2N3540			400	1000	125	300	4.0
2N3541			400	1200	125	300	4.0
2N3555			1.6	30	150	0.020	0.7
2N3556			1.6	60	150	0.020	0.7
2N3557			1.6	100	150	0.020	0.7
2N3558			1.6	200	150	0.020	0.7
2N3559			1.6	30	150	0.20	0.8
2N3560			1.6	60	150	0.20	0.8
2N3561			1.6	100	150	0.20	0.8
2N3562			1.6	200	150	0.20	0.8
2N3649			16	50	120	180	3.0
2N3650			16	100	120	180	3.0
2N3651			16	200	120	180	3.0
2N3652			16	300	120	180	3.0
2N3653			16	400	120	180	3.0
2N3654			16	50	120	180	3.0
2N3655			16	100	120	180	3.0
2N3656			16	200	120	180	3.0
2N3657			16	300	120	180	3.0
2N3658			16	400	120	180	3.0
2N3668	MCR649P-3	MCR649-1	13	100	100	40	2.0
2N3669	MCR649P-4	MCR649-1	13	200	100	40	2.0
2N3670	MCR649P-6	MCR649-1	13	400	100	40	2.0
2N3753			7.5	50	120	100	3.0
2N3754			7.5	100	120	100	3.0
2N3755			7.5	200	120	100	3.0
2N3756			7.5	300	120	100	3.0
2N3757			7.5	400	120	100	3.0
2N3758			7.5	500	120	100	3.0
2N3759			7.5	600	120	100	3.0
2N3760			7.5	700	120	100	3.0
2N3761			7.5	800	120	100	3.0
★2N3870		2N3870	22	100	100	40	2.0
★2N3871		2N3870	22	200	100	40	2.0
★2N3872		2N3870	22	400	100	40	2.0
★2N3873		2N3870	22	600	100	40	2.0
2N3884			175	50	125	300	4.0
2N3885			175	100	125	300	4.0
2N3886			175	200	125	300	4.0
2N3887			175	300	125	300	4.0
2N3888			175	400	125	300	4.0
2N3889			175	500	125	300	4.0
2N3890			175	600	125	300	4.0
2N3891			175	700	125	300	4.0
2N3892			175	800	125	300	4.0
2N3893			175	900	125	300	4.0
2N3894			175	1000	125	300	4.0
2N3895			175	1200	125	300	4.0
★2N3896		2N3870	22	100	100	40	2.0
★2N3897		2N3870	22	200	100	40	2.0
★2N3898		2N3870	22	400	100	40	2.0
★2N3899		2N3870	22	600	100	40	2.0
2N3936			7.0	100	125	60	3.2
2N3937			7.0	200	125	60	3.2
2N3938			7.0	300	125	60	3.2
2N3939			7.0	400	125	60	3.2
2N3940			7.0	500	125	60	3.2
2N3986			70	500	125	150	3.0
2N3987			70	600	125	150	3.0
2N3988			70	700	125	150	3.0
2N3989			70	800	125	150	3.0
2N3990			70	900	125	150	3.0
2N3991			70	1000	125	150	3.0
2N3992			70	1100	125	150	3.0
2N4096	2N4213	2N4212	0.2	50	125	0.2	0.8
2N4097	2N4214	2N4212	0.2	100	125	0.2	0.8
2N4098	2N4216	2N4212	0.2	50	125	0.2	0.8
2N4101	2N4166	2N4151	3.2	600	100	15	2.0
2N4102	2N4166	2N4151	1.3	600	100	15	2.0
2N4103	MCR649P-8	MCR649-1	8.0	600	100	40	2.0

TYPE	REPLACEMENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
2N4108	2N4213	2N4212		50	125		
2N4109	2N4214	2N4212		100	125		
2N4110	2N4216	2N4212		200	125		
2N4144	MCR1906-1	MCR1906-1	0.250	15	150	1.0	0.8
2N4145	MCR1906-1	MCR1906-1	0.250	30	150	1.0	0.8
2N4146	MCR1906-2	MCR1906-1	0.250	60	150	1.0	0.8
2N4147	MCR1906-3	MCR1906-1	0.250	100	150	1.0	0.8
2N4148	MCR1906-4	MCR1906-1	0.250	150	150	1.0	0.8
2N4149	MCR1906-4	MCR1906-1	0.250	200	150	1.0	0.8
★2N4151		2N4151	8.0	25	100	20	1.5
★2N4152		2N4151	8.0	50	100	20	1.5
★2N4153		2N4151	8.0	100	100	20	1.5
★2N4154		2N4151	8.0	200	100	20	1.5
★2N4155		2N4151	8.0	300	100	20	1.5
★2N4156		2N4151	8.0	400	100	20	1.5
★2N4157		2N4151	8.0	500	100	20	1.5
★2N4158		2N4151	8.0	600	100	20	1.5
★2N4159		2N4151	8.0	25	100	20	1.5
★2N4160		2N4151	8.0	50	100	20	1.5
★2N4161		2N4151	8.0	100	100	20	1.5
★2N4162		2N4151	8.0	200	100	20	1.5
★2N4163		2N4151	8.0	300	100	20	1.5
★2N4164		2N4151	8.0	400	100	20	1.5
★2N4165		2N4151	8.0	500	100	20	1.5
★2N4166		2N4151	8.0	600	100	20	1.5
★2N4167		2N4151	8.0	25	100	20	1.5
★2N4168		2N4151	8.0	50	100	20	1.5
★2N4169		2N4151	8.0	100	100	20	1.5
★2N4170		2N4151	8.0	200	100	20	1.5
★2N4171		2N4151	8.0	300	100	20	1.5
★2N4172		2N4151	8.0	400	100	20	1.5
★2N4173		2N4151	8.0	500	100	20	1.5
★2N4174		2N4151	8.0	600	100	20	1.5
★2N4175		2N4151	8.0	25	100	20	1.5
★2N4176		2N4151	8.0	50	100	20	1.5
★2N4177		2N4151	8.0	100	100	20	1.5
★2N4178		2N4151	8.0	200	100	20	1.5
★2N4179		2N4151	8.0	300	100	20	1.5
★2N4180		2N4151	8.0	400	100	20	1.5
★2N4181		2N4151	8.0	500	100	20	1.5
★2N4182		2N4151	8.0	600	100	20	1.5
★2N4183		2N4151	8.0	25	100	20	1.5
★2N4184		2N4151	8.0	50	100	20	1.5
★2N4185		2N4151	8.0	100	100	20	1.5
★2N4186		2N4151	8.0	200	100	20	1.5
★2N4187		2N4151	8.0	300	100	20	1.5
★2N4188		2N4151	8.0	400	100	20	1.5
★2N4189		2N4151	8.0	500	100	20	1.5
★2N4190		2N4151	8.0	600	100	20	1.5
★2N4191		2N4151	8.0	25	100	20	1.5
★2N4192		2N4151	8.0	50	100	20	1.5
★2N4193		2N4151	8.0	100	100	20	1.5
★2N4194		2N4151	8.0	200	100	20	1.5
★2N4195		2N4151	8.0	300	100	20	1.5
★2N4196		2N4151	8.0	400	100	20	1.5
★2N4197		2N4151	8.0	500	100	20	1.5
★2N4198		2N4151	8.0	600	100	20	1.5
★2N4199		2N4199	100*	300	105	50	1.5
★2N4200		2N4199	100*	400	105	50	1.5
★2N4201		2N4199	100*	500	105	50	1.5
★2N4202		2N4199	100*	600	105	50	1.5
★2N4203		2N4199	100*	700	105	50	1.5
★2N4204		2N4199	100*	800	105	50	1.5
★2N4212		2N4212	1.6	25	125	0.1	1.5
★2N4213		2N4212	1.6	50	125	0.1	1.5
★2N4214		2N4212	1.6	100	125	0.1	1.5
★2N4215		2N4212	1.6	150	125	0.1	1.5
★2N4216		2N4212	1.6	200	125	0.1	1.5
2N4217			1.0	250	125		
2N4218			1.0	300	125		

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2N4219-2N5571

TYPE	REPLACEMENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
2N4219			1.0	400	125		
2N4316	MCR3918-3	MCR3918	9.2	100	150	15	1.2
2N4317	MCR3918-4	MCR3918	9.2	200	150	15	1.2
2N4318	MCR3918-5	MCR3918	9.2	300	150	15	1.2
2N4319	MCR3918-6	MCR3918	9.2	400	150	15	1.2
★2N4361		2N4361	70	100		250	5.0
★2N4362		2N4361	70	200		250	5.0
★2N4363		2N4361	70	400		250	5.0
★2N4364		2N4361	70	600		250	5.0
★2N4365		2N4361	70	800		250	5.0
★2N4366		2N4361	70	1000		250	5.0
★2N4367		2N4361	70	1200		250	5.0
★2N4368		2N4361	70	1400		250	5.0
2N4369			70	1600		250	5.0
2N4370			70	1800		250	5.0
★2N4371		2N4361	70	100		250	5.0
★2N4372		2N4361	70	200		250	5.0
★2N4373		2N4361	70	400		250	5.0
★2N4374		2N4361	70	600		250	5.0
★2N4375		2N4361	70	800		250	5.0
★2N4376		2N4361	70	1000		250	5.0
★2N4377		2N4361	70	1200		250	5.0
★2N4378		2N4361	70	1400		250	5.0
2N4379			70	1600		250	5.0
2N4380			70	1800		250	5.0
★2N4441		2N4441	8.0	50	100	30	1.5
★2N4442		2N4441	8.0	200	100	30	1.5
★2N4443		2N4441	8.0	400	100	30	1.5
★2N4444		2N4441	8.0	600	100	30	1.5
2N4983			0.175	30	125	0.50	6.0
2N4984			0.200	30	150	0.15	7.5
2N4985			0.200	30	150	0.30	7.5
2N4986			0.175	30	125	0.20	7.0
2N4987			0.175	30	125	0.50	6.0
2N4988			0.200	30	150	0.15	7.5
2N4989			0.200	30	150	0.30	7.5
2N4990			0.175	30	125	0.20	7.0
2N4991	MBS4991	MBS4991	0.175		125	0.50	6.0
2N4992	MBS4992	MBS4991	0.200		150	0.12	7.5
★2N4993		2N4993	0.200		150	0.50	6.0
★2N5060		2N5060	0.8	30	125	0.2	0.8
★2N5061		2N5060	0.8	60	125	0.2	0.8
★2N5062		2N5060	0.8	100	125	0.2	0.8
★2N5063		2N5060	0.8	150	125	0.2	0.8
★2N5064		2N5060	0.510	200	125	350	1.2
★2N5164		2N5164	13	50	100	75	0.2
★2N5165		2N5164	13	200	100	75	0.2
★2N5166		2N5164	13	400	100	75	0.2
★2N5167		2N5164	13	600	100	75	0.2
★2N5168		2N5164	13	50	100	75	0.2
★2N5169		2N5164	13	200	100	75	0.2
★2N5170		2N5164	13	400	100	75	0.2
★2N5171		2N5164	13	600	100	75	0.2
2N5204			200	600		80	3.0
2N5205			200	600		80	3.0
2N5206			200	600		80	3.0
2N5207			200	600		80	3.0
2N5257			200	400	105	800	3.0
2N5258			200	600	105	800	3.0
2N5259			200	800	105	800	3.0
2N5260			200	1000	105	800	3.0
2N5261			200	1200	105	800	3.0
2N5273			25	200	125	150	3.5
2N5274			25	400	125	150	3.5
2N5275			25	600	125	150	3.5
2N5567			10	200	100	100	4.0
2N5568			10	400	100	100	4.0
2N5569			10	200	100	100	4.0
2N5570			10	400	100	100	4.0
2N5571			15	200	100	150	4.0

TYPE	REPLACEMENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
2N5572			15	400	100	150	4.0
2N5573			15	200	100	150	4.0
2N5574			15	400	100	150	4.0
2N5754			2.5	100	100	60	3.0
2N5755			2.5	200	100	60	3.0
2N5756			2.5	400	100	60	3.0
2N5757			2.5	600	100	60	3.0
2N5806			25	200	115	120	4.0
2N5807			25	400	115	120	4.0
2N5808			25	500	115	120	4.0
2N5809			25	600	115(1)	120	4.0
★2N6068		2N6068	4.0	25	110	60	2.5
★2N6068A		2N6068A	4.0	25	110	20	2.5
★2N6068B		2N6068A	4.0	25	110	15	2.5
★2N6069		2N6068	4.0	50	110	60	2.5
★2N6069A		2N6068A	4.0	50	110	20	2.5
★2N6069B		2N6068A	4.0	50	110	15	2.5
★2N6070		2N6068	4.0	100	110	60	2.5
★2N6070A		2N6068A	4.0	100	110	20	2.5
★2N6070B		2N6068A	4.0	100	110	15	2.5
★2N6071		2N6068	4.0	200	110	60	2.5
★2N6071A		2N6068A	4.0	200	110	20	2.5
★2N6071B		2N6068A	4.0	200	110	15	2.5
★2N6072		2N6068	4.0	300	110	60	2.5
★2N6072A		2N6068A	4.0	300	110	20	2.5
★2N6072B		2N6068A	4.0	300	110	15	2.5
★2N6073		2N6068	4.0	400	110	60	2.5
★2N6073A		2N6068A	4.0	400	110	20	2.5
★2N6073B		2N6068A	4.0	400	110	15	2.5
★2N6074		2N6068	4.0	500	110	60	2.5
★2N6074A		2N6068A	4.0	500	110	20	2.5
★2N6074B		2N6068A	4.0	500	110	15	2.5
★2N6075		2N6068	4.0	600	110	60	2.5
★2N6075A		2N6068A	4.0	600	110	20	2.5
★2N6075B		2N6068A	4.0	600	110	15	2.5
★2N6139		2N6139	10	200	100	125	2.5
★2N6140		2N6139	10	400	100	125	2.5
★2N6141		2N6139	10	600	100	125	2.5
★2N6142		2N6139	10	200	100	125	2.5
★2N6143		2N6139	10	400	100	125	2.5
★2N6144		2N6139	10	600	100	125	2.5
★2N6145		2N5571	15	200	150	150	4.0
★2N6146		2N5571	15	400	150	150	4.0
★2N6147		2N5571	15	600	150	150	4.0
★2N6148		2N6148	10	200	100	125	2.5
★2N6149		2N6148	10	400	100	125	2.5
★2N6150		2N6148	10	600	100	125	2.5
★2N6151		2N6151	10	200	100	100	2.5
★2N6152		2N6151	10	400	100	100	2.5
★2N6153		2N6151	10	600	100	100	2.5
★2N6154		2N6151	10	200	100	100	2.5
★2N6155		2N6151	10	400	100	100	2.5
★2N6156		2N6151	10	600	100	100	2.5
★2N6157		2N6157	30	200	125	200	3.4
★2N6158		2N6157	30	400	125	200	3.4
★2N6159		2N6157	30	600	125	200	3.4
★2N6160		2N6157	30	200	125	200	3.4
★2N6161		2N6157	30	400	125	200	3.4
★2N6162		2N6157	30	600	125	200	3.4
★2N6163		2N6157	30	200	125	200	3.4
★2N6164		2N6157	30	400	125	200	3.4
★2N6165		2N6157	30	600	125	200	3.4
★2N6167		2N6167	240	100	100	75	2.5
★2N6168		2N6167	240	200	100	75	2.5
★2N6169		2N6167	240	400	100	75	2.5
★2N6170		2N6167	240	600	100	75	2.5
★2N6171		2N3870	350	100	100	80	3.0
★2N6172		2N3870	350	200	100	80	3.0
★2N6173		2N3870	350	400	100	80	3.0
★2N6174		2N3870	350	600	100	80	3.0

TYPE	REPLACEMENT	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
★2N6236		2N6236		30	110	500*	1.0
★2N6237		2N6236		50	110	500*	1.0
★2N6238		2N6236		100	110	500*	1.0
★2N6239		2N6236		200	110	500*	1.0
★2N6240		2N6236		400	110	500*	1.0
★2N6241		2N6236		600	110	500*	1.0
2N6332			20	30	150	0.5	1.0
2N6333			20	50	150	0.5	1.0
2N6334			20	100	150	0.5	1.0
2N6335			20	200	150	0.5	1.0
2N6336			20	300	150	0.5	1.0
2N6337			20	400	150	0.5	1.0
2N6342			8.0	200	100	125	3.0
2N6342A			12	200	110	125	3.0
2N6343			8.0	400	100	125	3.0
2N6343A			12	400	110	125	3.0
2N6344			8.0	600	100	125	3.0
2N6344A			12	600	110	125	3.0
2N6345			8.0	800	100	125	3.0
2N6345A			12	800	110	125	3.0
2N6346			8.0	200	100	125	3.0
2N6346A			12	200	110	125	3.0
2N6347			8.0	400	100	125	3.0
2N6347A			12	400	110	125	3.0
2N6348			8.0	600	100	125	3.0
2N6348A			12	600	110	125	3.0
2N6349			8.0	800	100	125	3.0
2N6349A			12	800	110	125	3.0
★2N6394		2N6394	12	50	125	60	2.5
★2N6395		2N6394	12	100	125	60	2.5
★2N6396		2N6394	12	200	125	60	2.5
★2N6397		2N6394	12	400	125	60	2.5
★2N6398		2N6394	12	600	125	60	2.5
★2N6399		2N6394	12	800	125	60	2.5
★2N6400		2N6400	16	50	125	60	2.5
★2N6401		2N6400	16	100	125	60	2.5
★2N6402		2N6400	16	200	125	60	2.5
★2N6403		2N6400	16	400	125	60	2.5
★2N6404		2N6400	16	600	125	60	2.5
★2N6405		2N6400	16	800	125	60	2.5
3N58			0.064	40	150	0.001	0.65
3N59			0.064	40	150	0.001	0.65
3N60			0.064	40	150	0.001	0.65
3N80			0.127	40	150	0.001	0.65
3N81			0.127	65	150	0.001	0.65
3N82			0.127	100	150	0.001	0.65
3N83			0.032	70	125	0.15	0.80
3N84			0.111	40	125	0.01	0.65
3N85			0.111	100	125	0.01	0.65
3N86			0.127	65	150	0.001	0.65

* μA

TABLE 8 - FIELD-EFFECT TRANSISTORS INDEX

This table contains a numerical listing and short-form specifications for field-effect transistors with EIA-registered 2N and 3N numbers.

KEY

TYPE	POLARITY	CONST.	NEAREST EQUIVALENT	REFERENCE	I_{DSS} Min mA	I_{DSS} Max mA	I_{GSS} I_{DGO}* nA	Breakdown Voltage $V_{(BR)}$ Volts	Breakdown Voltage Sub-script	y_{fs} Min µmhos	y_{fs} Max µmhos	C_{iss} pF	NF dB µV*/$\sqrt{Hz}$	@ f	Units	NOTE D – Dual MP – Matched Pair
					* nA					*mmhos						

Numerical Listing of Registered Type Numbers
***Available from Motorola**

N – n-channel
P – p-channel

J – Junction FET
M – MOS FET

Type number of recommended replacement or nearest electrical equivalent

First type number on data sheet where the EIA type or replacement part is located.

Minimum and Maximum Drain Current with gate connected to source

Maximum Gate Current (Leakage) with drain connected to source
*Maximum leakage from drain to gate with source open

Noise Figure in dB or *, µV/$\sqrt{Hz}$ at a specified frequency

frequency units:
H – Hz
K – kHz
M – MHz

Maximum Input Capacitance

Minimum and Maximum Forward Transadmittance

Minimum Breakdown Voltage (Subscript defines conditions)
GS – Gate to source, drain connection not specified
GSS – Gate to source, drain connected to source
GD – Gate to drain, source connection not specified
GDS – Gate to drain, source connected to drain
DGO – Drain to gate, source open
DGS – Drain to gate, source connected to drain
DS – Drain to source, gate connection not specified
DSX – Drain to source, gate biased to cutoff or beyond

FIELD-EFFECT TRANSISTORS INDEX

2N2386-2N3452

TYPE	POLARITY	CONST.	REPLACEMENT	REFERENCE	I_{DSS}		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs}		C_{ISS}	NF	@ f	NOTE
					Min mA * nA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min µmhos *mmhos	Max µmhos	pF	dB µV*/√Hz	Units	
2N2386	P	J	2N3330	2N3330			10	20	GS	1000		50			
2N2386A	P	J	2N5267	2N5265	1.0	15	10	20	DGO	2200	5000	10			
2N2497	P	J	2N5267	2N5265	1.0	5.0	10	20	GD	1000	2000	32	3.0	1.0k	
2N2498	P	J	2N3330	2N3330	2.0	6.0	10	20	GD	1500	3000	32	3.0	1.0k	
2N2499	P	J	2N3909A	2N3330	5.0	15	10	20	GD	2000	4000	32	4.0	1.0k	
2N2500	P	J	2N5267	2N5265	1.0	6.0	10	20	GS	1000	2000	32	1.0	1.0k	
2N2606	P	J	2N5473	2N5471	0.1	0.5	1.0	30	GDS	110		6.0	3.0	1.0k	
2N2607	P	J	2N5475	2N5471	0.3	1.5	3.0	30	GDS	330		10	3.0	1.0k	
2N2608	P	J	2N3330	2N3330	0.9	4.5	10	30	GDS	1000		17	3.0	1.0k	
2N2609	P	J	2N3330	2N3330	2.0	10	30	30	GDS	2500		30	3.0	1.0k	
2N2620	N	J					100	50	DGO						
2N2794	P	J			1.5	5.0	10	20	DGO						
2N2841	P	J	2N5471	2N5471	0.025	0.125	1.0			60		6.0	3.0	1.0k	
2N2842	P	J	2N5472	2N5471	0.065	0.325	3.0			180		10	3.0	1.0k	
2N2843	P	J	2N5265	2N5265	0.2	1.0	10			540		17	3.0	1.0k	
2N2844	P	J	2N5265	2N5265	1.0	2.2	30			1400		30	3.0	1.0k	
2N3066	N	J	MFE2095	MFE2093	0.8	4.0	1.0	50	DGO	400	1000	10	3.0	1.0k	
2N3066A	N	J			0.8	4.0	1.0	50	DGO	400	1000	10	0.25	1.0k	
2N3067	N	J	MFE2093	MFE2093	0.2	1.0	1.0	50	DGO	400		18	3.0	1.0k	
2N3067A	N	J			0.2	1.0	1.0	50	DGO	300	1000	10	0.25	1.0k	
2N3068	N	J	MFE2093	MFE2093	0.05	0.25	1.0	50	DGO	200		18	3.0	1.0k	
2N3068A	N	J	MFE2093	MFE2093	0.05	0.25	1.0	50	DGO	200	1000	10	0.25	1.0k	
2N3069	N	J	2N4220	2N4220	2.0	10	1.0	50	DGO	1000		15	3.0	1.0k	
2N3069A	N	J			2.0	10	1.0	50	DGO	1000	2500	15	0.25	1.0k	
2N3070	N	J	2N4220A	2N4220	0.5	2.5	1.0	50	DGO	750		15	3.0	1.0k	
2N3070A	N	J			0.5	2.5	1.0	50	DGO	750	2500	15	0.25	1.0k	
2N3071	N	J	2N4220A	2N4220	0.1	0.6	1.0	50	DGO	500	2500	15	3.0	1.0k	
2N3084	N	J	MFE2095	MFE2093	0.8	3.0	0.1	15	DGO	400	2000	14			
2N3085	N	J	MFE2095	MFE2093	0.8	3.0	0.1	15	DGO	400	2000	14			
2N3086	N	J	MFE2095	MFE2093	0.8	3.0	1.0	30	DGS	400	2000	14			
2N3087	N	J	MFE2095	MFE2093	0.8	3.0	1.0	30	DGS	400	2000	14			
2N3088	N	J	MFE2094	MFE2093	0.5	2.0	1.0	10	DGS	300	2000	14	3.0		
2N3088A	N	J	MFE2094	MFE2093	0.5	2.0	1.0	10	DGS	300	2000	14	0.5	10H	
2N3089	N	J	MFE2094	MFE2093	0.5	2.0	1.0	10	DGS	300	2000	14	3.0		
2N3089A	N	J	MFE2094	MFE2093	0.5	2.0	1.0	10	DGS	300	2000	14	0.5	10H	
2N3112	P	J	2N5471	2N5471	0.035	0.175	0.05	20	GDS	50	115	3.5			
2N3113	P	J	2N5471	2N5471	0.035	0.175	0.05	20	GDS	50	115	2.0			
2N3277	P	J	2N5473	2N5471	0.15	0.5	0.4	25	DGO	100		3.0			
2N3278	P	J	2N5475	2N5471	0.4	0.9	0.4	25	DGO	150		3.0			
2N3328	P	J	2N5473	2N5471	1.0		1.0	20	GSS	100		3.0	3.0		
2N3329	P	J	2N5266	2N5265	1.0	3.0	10	20	GSS	1000	2000	20	3.0		
★2N3330	P	J		2N3330	2.0	6.0	10	20	GSS	1500	3000	20	3.0		
2N3331	P	J	2N3330	2N3330	5.0	15	10	20	GSS	2000	4000	20	4.0		
2N3332	P	J	2N5267	2N5265	1.0	6.0	10	20	GSS	1000	2200	20	1.0		
2N3333	P	J			0.3	1.0	10	20	GSS	600	1800	30			Dual
2N3334	P	J			0.3	1.0	10	20	GSS	600	1800	30			Dual
2N3335	P	J			0.3	1.0	10	20	GSS	600	1800	30			Dual
2N3336	P	J			0.3	1.0	10	20	GSS	600	1800	30			Dual
2N3365	N	J			0.8	4.0	5.0	40	DGO	250	1000	15			
2N3366	N	J	2N4091		0.2	1.0	5.0	40	DGO	250	1000	15			
2N3367	N	J	2N4091		0.005	0.25	5.0	40	DGO	100	1000	15			
2N3368	N	J	2N4221	2N4220	2.0	12	5.0	40	DGO	1000	4000	20			
2N3369	N	J	2N4220A	2N4220	0.5	2.5	5.0	40	DGO	600	2500	20			
2N3370	N	J	MFE2093	MFE2093	0.1	0.6	5.0	40	DGO	300	2500	20			
2N3376	P	J	2N3330	2N3330	0.6	6.0	3.0		DGS						
2N3377	P	J	2N3330	2N3330	0.6	6.0	3.0	30	DGS	800	2300	4.0			
2N3378	P	J	2N3330	2N3330	3.0	6.0	3.0	30	DGS	1500	2300	5.0			
2N3379	P	J	2N3330	2N3330	3.0	6.0	3.0	30	DGS	1500	2300	4.0			
2N3380	P	J	2N5268	2N5265	3.0	20	3.0	30	DGS	1500	3000	4.0			
2N3381	P	J	2N5268	2N5265	3.0	20	3.0	30	DGS	1500	3000	4.0			
2N3382	P	J	2N3994	2N3993	3.0	30	15	30	DGS	4500	12500				
2N3383	P	J	2N3994	2N3993	3.0	30	15	30	DGS	4500	12500				
2N3384	P	J	2N3993	2N3993	15	30	15	30	DGS	7500	12500				
2N3385	P	J	2N3993	2N3993	15	30	15	30	DGS	7500	12500				
2N3386	P	J	2N3993	2N3993	13	50	15	30	DGS	7500	12500				
2N3387	P	J	2N3993	2N3993	13	50	15	30	DGS	5000	10000				
2N3436	N	J	2N4222A	2N4220	3.0	15	0.5	50	DGO	2500	10000	18	2.0		
2N3437	N	J	2N4220A	2N4220	0.8	4.0	0.5	50	DGO	1500	6000	18	2.0		
2N3438	N	J	2N4222A	2N4220	0.2	1.0	0.5	50	DGO	800	4500	18	2.0		
2N3452	N	J	MFE2095	MFE2093	0.8	4.0	0.1	50	DGO	200	1200	6.0	2.0		

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TYPE	POLARITY	CONST.	REPLACEMENT	REFERENCE	I_{DSS} (* nA)		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs} (*mmhos)		C_{ISS}	NF	@ f	NOTE
					Min mA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min µmhos	Max µmhos	pF	dB µV*/$\sqrt{Hz}$	Units	
2N3453	N	J	MFE2094	MFE2093	0.2	1.0	0.1	50	DGO	150	900	6.0	2.0		
2N3454	N	J	MFE2093	MFE2093	0.05	0.25	0.1	50	DGO	100	600	6.0	2.0		
2N3455	N	J	MFE2095	MFE2093	0.8	4.0	0.04	50	DGO	400	1200	5.0	4.0		
2N3456	N	J	MFE2094	MFE2093	0.2	1.0	0.04	50	DGO	300	900	5.0	4.0		
2N3457	N	J	MFE2093	MFE2093	0.05	0.25	0.04	50	DGO	150	600	5.0	4.0		
2N2358	N	J	2N4222A	2N4220	3.0	15	0.25	50	DGO	2500	10000	18	6.0		
2N3459	N	J	2N4220A	2N4220	0.8	4.0	0.25	50	DGO	1500	6000	18	4.0		
2N3460	N	J	2N4220A	2N4220	0.2	1.0	0.25	50	DGO	800	4500	18	4.0		
2N3465	N	J	MFE2095	MFE2093	1.0	5.0	1.0	40	DGO	400	1200	15	5.0		
2N3466	N	J	MFE2095	MFE2093	1.0	5.0	1.0	40	DGO	400	1200	15	5.0		
2N3573	P	J	2N5471	2N5471	0.02	0.1	0.6	25	GSS	100	300	6.0	3.0		
2N3574	P	J	2N5472	2N5471	0.075	0.375	0.6	25	GSS	200	600	6.0	3.0		
2N3575	P	J	2N5474	2N5471	0.2	1.0	0.6	25	GSS	300	900	6.0	3.0		
2N3578	P	J	2N5476	2N5471	0.9	4.5	15	20	GSS	1200	3500	65			
2N3608	P	M	2N4352	2N4352	30	0.025									
2N3609	P	M	MFE3020	MFE3020	35	0.02									
2N3610	P	M	2N4352	2N4352	10	0.02									
2N3631	N	M	2N3797	2N3796	2.0	10		20	DSX	1400	2800	7.5			
2N3684	N	J	2N4221A	2N4221	2.5	7.5	0.1	50	GS	2000	3000	4.0	0.5		
2N3684A	N	J			2.5	7.5	0.1	50	GSS			4.0	0.5	100H	
2N3685	N	J	2N4220A	2N4221	1.0	3.0	0.1	50	GS	1500	2500	4.0	0.5		
2N3685A	N	J			1.0	3.0	0.1	50	GSS			4.0	0.5	100H	
2N3686	N	J	2N4220A	2N4221	0.4	1.2	0.1	50	GS	1000	2000	4.0	0.5		
2N3686A	N	J			0.4	1.2	0.1	50	GSS			4.0	0.5	100H	
2N3687	N	J	2N4220A	2N4221	0.1	0.5	0.1	50	GS	500	1500	4.0	.15*		
2N3687A	N	J			0.1	0.5	0.1	50	GSS			4.0	0.5	100H	
2N3695	P	J	2N5267	2N5265	1.25	3.75	0.1	30	GS	1000	1750	5.0	0.2*		
2N3696	P	J	2N5266	2N5265	0.5	1.5	0.1	30	GS	750	1250	5.0	0.2*		
2N3697	P	J	2N5265	2N5265	0.2	0.6	0.1	30	GS	500	1000	5.0	0.2*		
2N3698	P	J	2N5265	2N5265	0.05	0.25	0.1	30	GS	250	750	5.0	0.2*		
2N3796	N	M	2N3796	2N3796	0.5	3.0	0.001	25	DSX	900	1800	6.0	4.0		
2N3797	N	M	2N3797	2N3796	2.0	6.0	0.001	20	DSX	1500	3000	8.0	4.0		
2N3819	N	J	MPF108	MPF108	2.0	20	2.0	25	GSS	2000	6500	8.0			
2N3820	P	J	2N5460	2N5460	0.3	15	20	20	GSS	800	5000	32			
2N3821	N	J		2N3821	0.5	2.5	0.1	50	GSS	1500	4500	6.0	5.0	10H	
★2N3822	N	J		2N3821	2.0	10	0.1	50	GSS	3000	6500	6.0	5.0	10H	
★2N3823	N	J		2N3823	4.0	20	0.5	30	DGS	3500	6500	6.0	2.5	100M	
★2N3824	N	J		2N3821			0.1	50	GSS			6.0			
2N3882	P	M	MFE3003	MFE3003	0.25		0.1	30	DS	1000	2400	4.0	3.0		
2N3909	P	J	2N5460	2N5460	0.3	15	10	20	DGS	1000	5000	32			
2N3909A	P	J	2N5460	2N5460	1.0	15	10	20	GSS	2000		9.0			
2N3921	N	J			1.0	10	0.25	50	GSS	1500	7500	18	2.0	1.0k	Dual
2N3922	N	J			1.0	10	0.25	50	GSS	1500	7500	18	2.0	1.0k	Dual
2N3934	N	J			0.25	1.3	0.1	50	GSS	300	900	7.0	2.0	100H	Dual
2N3935	N	J			0.25	1.3	0.1	50	GSS	300	900	7.0	2.0	100H	Dual
2N3954	N	J			0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100H	Dual
2N3954A	N	J			0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100H	
2N3955	N	J			0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100H	Dual
2N3955A	N	J			0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100H	
2N3956	N	J			0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100H	Dual
2N3957	N	J			0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100H	Dual
2N3958	N	J			0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100H	Dual
2N3966	N	J	2N4221	2N4220	2.0		0.1	30	DGS			6.0			
2N3967	N	J	2N4221A	2N4220	2.5	10	0.1	30	DGS	1600	2400	5.0			
2N3967A	N	J	2N4221A	2N4220	2.5	10	0.1	30	GSS	1600	2400	5.0	1.5	100H	
2N3968	N	J	2N4221A	2N4220	1.0	5.0	0.1	30	DGS	1400	2000	5.0			
2N3968A	N	J	2N4221A	2N4220	1.0	5.0	0.1	30	GSS	1400	2000	5.0	1.5	100H	
2N3969	N	J	2N4220A	2N4220	0.4	2.0	0.1	30	DGS	950	1450	5.0			
2N3969A	N	J	2N4220A	2N4220	0.4	2.0	0.1	30	GSS	950	1450	5.0	1.5	100H	
★2N3970	N	J		2N3970	50	150	0.25*	40	DGS			25			
★2N3971	N	J		2N3970	25	75	0.25*	40	DGS			25			
★2N3972	N	J		2N3970	5.0	30	0.25*	40	DGS			25			
★2N3993	P	J		2N3993	10		1.2*	25	GSS	6000	12000	16			
★2N3994	P	J		2N3993	2.0		1.2*	25	GSS	4000	10000	16			
2N4038	N	M	2N3796	2N3796		0.1		15	DSX						
2N4039	N	M	2N3796	2N3796	0.1	1.5		15	DSX						
2N4065	P	M	2N4352	2N4352		0.005	0.0025	25	GSS			4.5			
★2N4066	P	M		2N4066			0.0025	25	GSS			7.0			
★2N4067	P	M		2N4066		1.0*		30	DSS	2500		7.0			
2N4082	N	J			0.25	1.3	0.1	50		300		7.0			Dual

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2N4083-2N4867A

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TYPE	POLARITY	CONST.	REPLACEMENT	REFERENCE	I_{DSS}		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs}		C_{iss}	NF @ f		NOTE
					Min mA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min µmhos	Max µmhos	pF	dB µV*/$\sqrt{Hz}$	Units	
					* nA					*mmhos					
2N4083	N	J			0.25	1.3	0.1	50		300		7.0			Dual
2N4084	N	J			1.0	10	0.25	50		1500		18			Dual
2N4085	N	J			1.0	10	0.25	50		1500		18			Dual
2N4088	P	J	MPF161	MPF161	5.0	15	0.1	30	GSS	1000	1600	10	1.5	1.0k	
2N4089	P	J	MPF161	MPF161	2.0	8.0	0.1	30	GSS	800	1300	10	1.5	1.0k	
2N4090	P	J	MPF161	MPF161	0.4	2.5	0.1	30	GSS	500	900	10	1.5	1.0k	
★2N4091	N	J		2N4091	30		0.2*	40	DGO			16			
2N4091A	N	J	2N4091	2N4091	30		0.04	50	GSS			16			
★2N4092	N	J		2N4091	15		0.2*	40	DGO			16			
2N4092A	N	J	2N4092	2N4091	15		0.04	50	GSS			16			
★2N4093	N	J		2N4091	8.0		0.2*	40	DGO			16			
2N4093A	N	J	2N4093	2N4091	8.0		0.04	50	GSS			16			
2N4094	N	J	2N4091	2N4091	75			40	GSS			32			
2N4095	N	J	2N4092	2N4091	20			40	GSS			32			
2N4117	N	J	MFE2093	MFE2093	0.03	0.09	0.01	40	GSS	70	210	3.0			
2N4117A	N	J	MFE2093	MFE2093	0.03	0.09	0.001	40	DGO			3.0			
2N4118	N	J	MFE2093	MFE2093	0.08	0.24	0.01	40	GSS	80	250	3.0			
2N4118A	N	J	MFE2093	MFE2093	0.08	0.24	0.001	40	DGO			3.0			
2N4119	N	J	MFE2093	MFE2093	0.2	0.6	0.01	40	GSS	100	330	3.0			
2N4119A	N	J	MFE2093	MFE2093	0.2	0.6	0.001	40	DGO			3.0			
2N4120	P	M	2N4352	2N4352		500*	0.0025	30	DSS	700		0.7			
2N4139	N	J	2N4222A	2N4221	8.0	11	1.0	50	DGO			18			
★2N4220	N	J		2N4220	0.5	3.0	0.1	30	GSS	1000	4000	6.0			
★2N4220A	N	J		2N4220	0.5	3.0	0.1	30	GSS	1000	4000	6.0	2.5	1.0H	
★2N4221	N	J		2N4220	2.0	6.0	0.1	30	GSS	2000	5000	6.0			
★2N4221A	N	J		2N4220	2.0	6.0	0.1	30	GSS	2000	5000	6.0	2.5	1.0H	
★2N4222	N	J		2N4220	5.0	15	0.1	30	GSS	2500	6000	6.0			
★2N4222A	N	J		2N4220	5.0	15	0.1	30	GSS	2500	6000	6.0	2.5	1.0H	
★2N4223	N	J		2N4223	3.0	18	0.25	30	GSS	3000	7000	6.0	5.0	200M	
★2N4224	N	J		2N4223	2.0	20	0.5	30	GSS	2000	7500	6.0			
2N4267	P	M	2N4352	2N4352		0.001	0.005	30	GSS			15			
2N4268	P	M	MFE3003	MFE3003		0.001	0.005	30	GSS			15			
2N4302	N	J	2N5457	2N5457		5.0	1.0	30	DGO			6.0			
2N4303	N	J	2N5458	2N5457		10	1.0	30	DGO			6.0			
2N4304	N	J	2N5457	2N5457		15	1.0	30	DGO			6.0			
2N4338	N	J	2N4220A	2N4220	0.2	0.6	0.1	50	DGO			6.0			
2N4339	N	J	2N4220A	2N4220	0.5	1.5	0.1	50	DGO			6.0			
2N4340	N	J	2N4220A	2N4220	1.2	3.6	0.1	50	DGO			6.0			
2N4341	N	J	2N4221A	2N4220	3.0	9.0	0.1	50	DGO			6.0			
2N4342	P	J		2N4342	4.0	12	10	25	DGO			5.0			
2N4343	P	J		2N4342	10	30	10	25	DGO			5.0			
★2N4351	N	M		2N4351		0.01	0.01	25	DSS	1000		5.5			
★2N4352	P	M		2N4352		0.005	0.01	25	DSS	1000		6.5.			
2N4353	P	M	2N4352	2N4352				3.0	GSS	1000	4000	12			
★2N4360	P	J		2N4360	3.0	30	10	20	GSS	2000	8000	20	5.0	100H	
2N4382	P	J	2N3994	2N3993	10	30	1.0	25	GSS			5.0			
★2N4391	N	J		2N4391	50	100	0.1	40	GSS						
★2N4392	N	J		2N4391	25	75	0.1	40	GSS						
★2N4393	N	J		2N4391	5.0	30	0.1	40	GSS						
★2N4416	N	J		2N4416	5.0	15		30	GSS			4.0			
2N4416A	N	J	2N4416	2N4416	5.0	15	0.1	35	GSS	4500	7500	4.0	4.0	400M	
2N4417	N	J	2N4416	2N4416	5.0	15		30	GSS			3.5			
2N4445	N	J	MFE2012	MFE2010			3.0	25	GSS			50			
2N4446	N	J	MFE2012	MFE2010			3.0	25	GSS			50			
2N4447	N	J	MFE2012	MFE2010			3.0	20	GSS			50			
2N4448	N	J	MFE2012	MFE2010			3.0	20	GSS			50			
★2N4856	N	J		2N4856	50		0.25	40	GSS			18			
★2N4856A	N	J		2N4856	50		0.25	40	GSS			10			
★2N4857	N	J		2N4856	20	100	0.25	40	GSS			18			
★2N4857A	N	J		2N4856	20	100	0.25	40	GSS			10			
★2N4858	N	J		2N4856	8.0	80	0.25	40	GSS			18			
★2N4858A	N	J		2N4856	8.0	80	0.25	40	GSS			10			
★2N4859	N	J		2N4856	50		0.25	30	GSS			18			
★2N4859A	N	J		2N4856	50		0.25	30	GSS			10			
★2N4860	N	J		2N4856	20	100	0.25	30	GSS			18			
★2N4860A	N	J		2N4856	20	100	0.25	30	GSS			10			
★2N4861	N	J		2N4856	8.0	80	0.25	30	GSS			15			
★2N4861A	N	J		2N4856	8.0	80	0.25	30	GSS			10			
2N4867	N	J	2N4220A	2N4220	0.4	1.2	0.25	40	GSS	700	2000	25	1.0	1.0k	
2N4867A	N	J	2N4220A	2N4220	0.4	1.2	0.25	40	GSS	700	2000	25	1.0	1.0k	

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TYPE	POLARITY	CONST.	REPLACEMENT	REFERENCE	I_{DSS}		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs}		C_{iss}	NF @	f	NOTE
					Min mA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min μmhos	Max μmhos	pF	dB μV*/$\sqrt{Hz}$	Units	
					*nA					*mmhos					
2N4868	N	J	2N4220A	2N4220	1.0	3.0	0.25	40	GSS	1000	3000	25	1.0	1.0k	
2N4868A	N	J	2N4220A	2N4220	1.0	3.0	0.25	40	GSS	1000	3000	25	1.0	1.0k	
2N4869	N	J	2N4221A	2N4220	2.5	7.5	0.25	40	GSS	1300	4000	25	1.0	1.0k	
2N4869A	N	J	2N4221A	2N4220	2.5	7.5	0.25	40	GSS	1300	4000	25	1.0	1.0k	
2N4881	N	J	2N3365	2N3365	0.4	2.0	2.0	100	GSS			15			
2N4882	N	J	2N3365	2N3365	1.5	7.5	2.0	100	GSS			15			
2N4883	N	J	2N3365	2N3365	0.4	2.0	1.0	100	GSS			15			
2N4884	N	J	2N3365	2N3365	1.5	7.5	1.0	100	GSS			15			
2N4885	N	J	2N3365	2N3365	0.4	2.0	1.0	75	GSS			15			
2N4886	N	J	2N3365	2N3365	1.5	7.5	1.0	75	GSS			15			
2N4977	N	J	MFE2009	MFE2007	50		0.5	30	GSS			35			
2N4978	N	J	MFE2008	MFE2007	15		0.5	30	GSS			35			
2N4979	N	J	MFE2007	MFE2007	7.5		0.5	30	GSS			35			
2N5018	P	J	2N3993	2N3993	10		2.0	30	GSS			45			
2N5019	P	J	2N3993	2N3993	5.0		2.0	30	GSS			45			
2N5020	P	J	2N5265	2N5265	0.3	1.2	1.0	25	GSS			25			
2N5021	P	J	2N5266	2N5265	1.0	3.5	1.0	25	GSS			25			
2N5033	P	J	2N5265	2N5265	0.3	3.5	10	20	GSS	1000	5000	25	2.0	1.0k	
2N5045	N	J			0.5	8.0	0.25					8.0			
2N5046	N	J			0.5	8.0	0.25					8.0			
2N5047	N	J			0.5	8.0	0.25					8.0			
2N5078	N	J	2N4416	2N4416	4.0	25	0.25	30	GSS	4500	10000	6.0	3.0	200M	
2N5103	N	J	2N3823	2N3823	1.0	8.0	0.1	25	GSS	2000	8000	5.0	1.5	100H	
2N5104	N	J	2N3823	2N3823	2.0	6.0	0.1	25	GSS	3500	7500	5.0	1.5	100H	
2N5105	N	J	2N3823	2N3823	5.0	15	0.1	25	GSS	5000	10000	5.0	1.5	100H	
2N5114	P	J	2N3993	2N3993	30	90	0.5	30	GSS			25			
2N5115	P	J	2N3993	2N3993	15	60	0.5	30	GSS			25			
2N5116	P	J	2N3993	2N3993	5.0	25	0.5	30	GSS			25			
2N5158	N	J	MFE2012	MFE2010			1.0	40	GSS			50			
2N5159	N	J	MFE2012	MFE2010			1.0	40	GSS			50			
2N5163	N	J	MPF102	MPF102	1.0	40	10	25	GSS	2000	9000	12			
2N5196	N	J	MMF1	MMF1	0.7	7.0	0.025	50	GSS	1000	4000	6.0	1.0	100H	
2N5197	N	J			0.7	7.0	0.025	50	GSS	1000	4000	6.0	1.0	100H	
2N5198	N	J			0.7	7.0	0.025	50	GSS	1000	4000	6.0	1.0	100H	
2N5199	N	J			0.7	7.0	0.025	50	GSS	1000	4000	6.0	1.0	100H	
2N5245	N	J	2N5486	2N5484	5.0	15	1.0	30	GSS	4500	7500	4.5	2.0	100M	
2N5246	N	J	2N5485	2N5484	1.5	7.0	1.0	30	GSS	3000	6000	4.5			
2N5247	N	J	2N5486	2N5484	8.0	24	1.0	30	GSS	4500	8000	4.5			
2N5248	N	J	MPF102	MPF102	4.0	20	5.0	30	GSS	3500	6500	6.0			
★2N5265	P	J		2N5265	0.5	1.0	2.0	60	GSS	900	2700	7.0	2.5	100H	
★2N5266	P	J		2N5265	0.8	1.6	2.0	60	GSS	1000	3000	7.0	2.5	100H	
★2N5267	P	J		2N5265	1.5	3.0	2.0	60	GSS	1500	3500	7.0	2.5	100H	
★2N5268	P	J		2N5265	2.5	5.0	2.0	60	GSS	2000	4000	7.0	2.5	100H	
★2N5269	P	J		2N5265	4.0	8.0	2.0	60	GSS	2200	4500	7.0	2.5	100H	
★2N5270	P	J		2N5265	7.0	14.0	2.0	60	GSS	2500	5000	7.0	2.5	100H	
2N5277	N	J	2N3822	2N3821	2.5	12.5	5.0	150	GSS	2000	5000	25	3.0	1.0k	
2N5278	N	J	2N5364	2N5358	10	25	5.0	150	GSS	3000	6000	25	3.0	1.0k	
★2N5358	N	J		2N5358	0.5	1.0	0.1	40	GSS	1000	3000	6.0	2.5	100H	
★2N5359	N	J		2N5358	0.8	1.6	0.1	40	GSS	1200	3600	6.0	2.5	100H	
★2N5360	N	J		2N5358	1.5	3.0	0.1	40	GSS	1400	4200	6.0	2.5	100H	
★2N5361	N	J		2N5358	2.5	5.0	0.1	40	GSS	1500	4500	6.0	2.5	100H	
★2N5362	N	J		2N5358	4.0	8.0	0.1	40	GSS	2000	5500	6.0	2.5	100H	
★2N5363	N	J		2N5358	7.0	14	0.1	40	GSS	2500	6000	6.0	2.5	100H	
★2N5364	N	J		2N5358	9.0	18	0.1	40	GSS	2700	6500	6.0	2.5	100H	
2N5391	N	J	2N5358	2N5358	0.5	1.5	0.2	70	GSS	1500	4500	18	1.0	100H	
2N5392	N	J	2N5360	2N5358	1.0	3.0	0.2	70	GSS	2000	6000	18	1.0	100H	
2N5393	N	J	2N5360	2N5358	2.5	4.5	0.2	70	GSS	3000	6500	18	1.0	100H	
2N5394	N	J	2N5361	2N5358	4.0	6.0	0.2	70	GSS	4000	7000	18	1.0	100H	
2N5395	N	J	2N5362	2N5358	5.5	8.0	0.2	70	GSS	4500	7000	18	1.0	100H	
2N5396	N	J	2N5362	2N5358	7.5	10	0.2	70	GSS	4500	7500	18	1.0	100H	
2N5397	N	J	MFE2001	MFE2000	10	30	0.1	25	GSS	6000	10000	5.0	3.5	450M	
2N5398	N	J	MFE2001	MFE2000	5.0	40	0.1	25	GSS	5500	10000	5.5			
2N5432	N	J	MFE2012	MFE2012	150		0.2	25	GSS			30			
2N5433	N	J	MFE2012	MFE2012	100		0.2	25	GSS			30			
2N5434	N	J	MFE2012	MFE2012	30		0.2	25	GSS			30			
2N5452	N	J			0.5	5.0	0.1	50	GSS	1000	3000	4.0	.02*	1.0k	
2N5453	N	J			0.5	5.0	0.1	50	GSS	1000	3000	4.0	.02*	1.0k	
2N5454	N	J			0.5	5.0	0.1	50	GSS	1000	3000	4.0	.02*	1.0k	
★2N5457	N	J		2N5457	1.0	5.0	1.0	25	GSS	1000	5000	7.0			
★2N5458	N	J		2N5457	2.0	8.0	1.0	25	GSS	1500	5500	7.0			

2N5459-2N5799

TYPE	POLARITY	CONST.	REPLACEMENT	REFERENCE	I_{DSS}		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs}		C_{ISS}	NF @ f		NOTE
					Min mA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min µmhos	Max µmhos	pF	dB µV*/√Hz	Units	
					* nA					*mmhos					
★2N5459	N	J		2N5457	4.0	16	1.0	25	GSS	2000	6000	7.0			
★2N5460	P	J		2N5460	1.0	5.0	5.0	40	GSS	1000	4000	7.0	2.5	100H	
★2N5461	P	J		2N5460	2.0	9.0	5.0	40	GSS	1500	5000	7.0	2.5	100H	
★2N5462	P	J		2N5460	4.0	16	5.0	40	GSS	2000	6000	7.0	2.5	100H	
★2N5463	P	J		2N5460	1.0	5.0	5.0	60	GSS	1000	4000	7.0	2.5	100H	
★2N5464	P	J		2N5460	2.0	9.0	5.0	60	GSS	1500	5000	7.0	2.5	100H	
★2N5465	P	J		2N5460	4.0	16	5.0	60	GSS	2000	6000	7.0	2.5	100H	
★2N5471	P	J		2N5471	0.02	0.06	0.5	40	GSS	60	180	5.0	2.5	1.0k	
★2N5472	P	J		2N5471	0.05	0.12	0.5	40	GSS	90	225	5.0	2.5	1.0k	
★2N5473	P	J		2N5471	0.10	0.25	0.5	40	GSS	120	300	5.0	2.5	1.0k	
★2N5474	P	J		2N5471	0.20	0.50	0.5	40	GSS	160	400	5.0	2.5	1.0k	
★2N5475	P	J		2N5471	0.40	1.0	0.5	40	GSS	200	500	5.0	2.5	1.0k	
★2N5476	P	J		2N5471	0.80	2.0	0.5	40	GSS	260	650	5.0	2.5	1.0k	
★2N5484	N	J		2N5484	1.0	5.0	1.0	25	GSS	3000	6000	5.0	3.0	100M	
★2N5485	N	J		2N5484	4.0	10	1.0	25	GSS	3500	7000	5.0	2.0	100M	
★2N5486	N	J		2N5484	8.0	20	1.0	25	GSS	4000	8000	5.0	2.0	100M	
2N5505	P	J					0.25	30	GSS	1000	3500	16	2.0	1.0k	Dual
2N5506	P	J					0.25	30	GSS	1000	3500	16	2.0	1.0k	Dual
2N5507	P	J					0.25	30	GSS	1000	3500	16	2.0	1.0k	Dual
2N5508	P	J					0.25	30	GSS	1000	3500	16	2.0	1.0k	Dual
2N5509	P	J					0.25	30	GSS	1000	3500	16	2.0	1.0k	Dual
2N5510	P	J					0.25	30	GSS	500	3000	16	2.0	1.0k	Dual
2N5511	P	J					0.25	30	GSS	500	3000	16	2.0	1.0k	Dual
2N5512	P	J					0.25	30	GSS	500	3000	16	2.0	1.0k	Dual
2N5513	P	J					0.25	30	GSS	500	3000	16	2.0	1.0k	Dual
2N5514	P	J					0.25	30	GSS	500	3000	16	2.0	1.0k	Dual
2N5515	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	2.0	1.0H	Dual
2N5516	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	2.0	1.0H	Dual
2N5517	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	2.0	1.0H	Dual
2N5518	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	2.0	1.0H	Dual
2N5519	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	2.0	1.0H	Dual
2N5520	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	1.0	1.0H	Dual
2N5521	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	1.0	1.0H	Dual
2N5522	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	1.0	1.0H	Dual
2N5523	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	1.0	1.0H	Dual
2N5524	N	J			0.5	7.5	0.25	40	GSS	1000	4000	25	1.0	1.0H	Dual
2N5543	N	J	2N3822	2N3819	2.0	10	1000			750	3000	10			
2N5544	N	J	2N3822	2N3819	2.0	10	1000			750	3000	10			
2N5545	N	J	MMF1	MMF1	0.5	8.0	0.1			1500	6000	6.0	3.5	10H	Dual
2N5546	N	J	MMF1	MMF1	0.5	8.0	0.1			1500	6000	6.0	5.0	10H	Dual
2N5547	N	J	MMF1	MMF1	0.5	8.0	0.1			1500	6000	6.0			Dual
2N5548	P	M	MFE3003	MFE3001		10*	0.05			3500	6500	10			
2N5549	N	J	2N4093	2N4088	10	60	0.25	40	GSS	6000	15000	8.0			
★2N5555	N	J		2N5555	15		1.0	25	GSS			5.0			
★2N5556	N	J		2N5556	0.5	2.5	0.1	30	GSS	1500	6500	6.0	1.0	10H	
★2N5557	N	J		2N5556	2.0	5.0	0.1	30	GSS	1500	6500	6.0	1.0	10H	
★2N5558	N	J		2N5556	4.0	10	0.1	30	GSS	1500	6500	6.0	1.0	10H	
2N5561	N	J			1.0	10	0.1	50	GSS			7.0	1.0	10H	MP
2N5562	N	J			1.0	10	0.1	50	GSS			7.0	1.0	10H	MP
2N5563	N	J			1.0	10	0.1	50	GSS			7.0	1.0	10H	MP
2N5564	N	J			5.0	30	0.1	40	GSS			12	1.0	10H	MP
2N5565	N	J			5.0	30	0.1	40	GSS			12	1.0	10H	MP
2N5566	N	J			5.0	30	0.1	40	GSS			12	1.0	10H	MP
2N5592	N	J			1.0	10	0.25	50	GSS			20	2.6	10H	
2N5593	N	J			1.0	10	0.25	50	GSS			20	6.0	10H	
2N5594	N	J			1.0	10	0.25	50	GSS			20	10	10H	
2N5638	N	J				50	1.0	30	GSS				10		
2N5639	N	J				25	1.0	30	GSS				10		
2N5640	N	J				5.0	1.0	30	GSS				10		
2N5647	N	J	2N5556	2N5555	0.3	0.6	0.01	50	GSS			3.0	1.0	1.0k	
2N5648	N	J	2N5556	2N5555	0.5	1.0	0.01	50	GSS			3.0	1.0	1.0k	
2N5649	N	J	2N5556	2N5555	0.8	1.6	0.01	50	GSS			3.0	1.0	1.0k	
2N5653	N	J	2N5556	2N5555	40		1.0	30	GSS			10	2.5		
2N5654	N	J			15		1.0	30	GSS			10	2.5		
★2N5668	N	J		2N5668	1.0	5.0	2.0	25	GSS			7.0	2.5	100M	
★2N5669	N	J		2N5668	4.0	10	2.0	25	GSS			7.0	2.5	100M	
★2N5670	N	J		2N5668	8.0	20	2.0	25	GSS			7.0	2.5	100M	
★2N5797	P	J		2N5797	0.02	0.10	3.0	40	GSS	60*	225*	5.0			MP
★2N5798	P	J		2N5797	0.08	0.40	3.0	40	GSS	100*	440*	5.0			MP
★2N5799	P	J		2N5797	0.25	1.00	3.0	40	GSS	160*	500*	5.0			MP

TYPE	POLARITY	CONST.	REPLACEMENT	REFERENCE	I_{DSS}		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs}		C_{iss}	NF @ f		NOTE
					Min mA *nA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min µmhos *mmhos	Max µmhos	pF	dB $\mu V^*/\sqrt{Hz}$	Units	
★2N5800	P	J		2N5797	0.70	2.00	3.0	40	GSS	250*	700*	5.0			MP
2N5801	N	J			2.0	15	0.1	40	GSS			15	1.0	100H	MP
2N5802	N	J			10	40	0.1	40	GSS			15	1.0	100H	MP
2N5803	N	J			30	80	0.1	40	GSS			15	1.0	100H	MP
2N5902	N	J			0.03	0.5	0.005	40	GSS	70	250	3.0	3.0	100H	MP
2N5903	N	J			0.03	0.5	0.005	40	GSS	70	250	3.0	3.0	100H	MP
2N5904	N	J			0.03	0.5	0.005	40	GSS	70	250	3.0	3.0	100H	MP
2N5905	N	J			0.03	0.5	0.005	40	GSS	70	250	3.0	3.0	100H	MP
2N5906	N	J			0.03	0.5	0.002	40	GSS	70	250	3.0	1.0	100H	MP
2N5907	N	J			0.03	0.5	0.002	40	GSS	70	250	3.0	1.0	100H	MP
2N5908	N	J			0.03	0.5	0.002	40	GSS	70	250	3.0	1.0	100H	MP
2N5909	N	J			0.03	0.5	0.002	40	GSS	70	250	3.0	1.0	100H	
2N5949	N	M	2N5638	2N5638	12	18	1.0	30	GSS	3.0	7.5	6.0	2.0	1.0k	
2N5950	N	M	2N5639	2N5638	10	15	1.0	30	GSS	3.0	7.5	6.0	2.0	1.0k	
2N5951	N	M	2N5640	2N5638	7.0	13	1.0	30	GSS	3.0	6.5	6.0	2.0	1.0k	
2N5952	N	M	2N5640	2N5638	4.0	8.0	1.0	30	GSS	1.0	6.5	6.0	2.0	1.0k	
2N5953	N	M	2N5640	2N5638	2.5	5.0	1.0	30	GSS	1.0	6.5	6.0	2.0	1.0k	
2N6449	S	N			2.0	10	10	300	GSS	0.5*	3.0*	10			
2N6450	S	N			2.0	10	10	200	GSS	0.5*	3.0*	10			
2N6451	S	N			5.0	20	0.1	20	GSS	15*	30*	25	1.5	10H	
2N6452	S	N			5.0	20	0.5	25	GSS	15*	30*	25	2.5	10H	
2N6453	S	N			15	50	0.1	20	GSS	20*	40*	25	1.5	10H	
2N6454	S	N			15	50	0.5	25	GSS	20*	40*	25	2.5	10H	
3N89	P	J			0.5	2.5	5.0	30		450	1300	3.0			
3N96	P	J			0.5	2.5	5.0	30		450	1300	4.0			Dual
3N97	P	J			0.5	2.5	5.0	30		450	1300	4.0			Dual
3N98	N	M	MFE3004	MFE3004	3.5	7.7	0.05	32		1000	3000	7.0			
3N99	N	M	MFE3004	MFE3004	5.0	10.5	0.05	32		1000	4500	7.0			
★3N124	N	J		3N124	0.2	2.0	0.25	50	GSS	500	2000	14	4.0	1.0k	
★3N125	N	J		3N124	1.5	4.5	0.25	50	GSS	800	2400	14	4.0	1.0k	
★3N126	N	J		3N124	3.0	9.0	0.25	50	GSS	1200	3600	14	4.0	1.0k	
★3N128	N	M			5.0	25	5.0			5000	12000	7.0	5.0	200M	
3N138	N	M	MFE3004	MFE3004			0.010	45	GD			5.0			
3N139	N	M	MFE3004	MFE3004	5.0	25	1.0	45	GD	3000	7500	7.0			
★3N140	N	M		3N140	5.0	30	1.0	20	DS			7.0	4.5	200M	
3N141	N	M	MFE3006	MFE3006	5.0	30	1.0	20	DS			7.0			
3N142	N	M	MFE3004	MFE3004	5.0	50	5.0	20	DS			10			
3N143	N	M	MFE3004	MFE3004	10	50	1.0					7.0			
3N145	P	M	2N4352	2N4352				30	DB						
3N146	P	M	3N157A	3N157				30	DB						
3N147	P	M						30	DB						
3N148	P	M						30	DB						
3N149	P	M	3N157A	3N157				30	DB						
3N150	P	M	3N157A	3N157				30	DB						
3N151	P	M			5.0*							12	10	100H	
3N152	N	M	MFE3004	MFE3004	5.0	30	1.0						3.5	200M	
3N153	N	M	MFE3004	MFE3004			0.05					8.0			
3N154	N	M	MFE3004	MFE3004	10	25	0.05						5.0	200M	
★3N155	P	M		3N155		1.0	1.0	35	DSS	1000	4000	5.0			
★3N155A	P	M		3N155		0.25	1.0	35	DSS	1000	4000	5.0			
★3N156	P	M		3N155		1.0	1.0	35	DSS	1000	4000	5.0			
★3N156A	P	M		3N155		0.25	1.0	35	DSS	1000	4000	5.0			
★3N157	P	M		3N157		1.0	0.010	35	DSS	1000	4000	5.0			
★3N157A	P	M		3N157		0.25	0.010	50	DSS	1000	4000	5.0			
★3N158	P	M		3N157		1.0	0.010	35	DSS	1000	4000	5.0			
★3N158A	P	M		3N157		0.25	0.010	50	DSS	1000	4000	5.0			
3N159	N	M	MFE3007	MFE3007	5.0	30	1.0			7000	18000	7.0	3.5	200M	
3N160	P		MFE3003	MFE3001		10*	0.01			3500	6500	10			
3N161	P		MFE3003	MFE3001		10*				3500	6500	10			
3N162	P	M	MFE3003	MFE3001		150*						20			
3N163	P	M	MFE3003	MFE3001		0.2*	0.01					2.5			
3N164	P	M				0.4*	0.01					2.5			
3N165	P	M				0.2*	0.01					3.0			
3N166	P	M				0.2*	0.01					3.0			
3N167	P	M				-0.5*						35			
3N168	P	M				-1.0*						35			
★3N169	N	M		3N169		10*						5.0			
★3N170	N	M		3N169		10*						5.0			

3N171-3N218

TYPE	POLARITY	CONST.	REPLACEMENT	REFERENCE	I_{DSS} (* nA)		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs} (*mmhos)		C_{ISS}	NF	@ f	NOTE
					Min mA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min μmhos	Max μmhos	pF	dB $\mu V^*/\sqrt{Hz}$	Units	
★3N171	N	M		3N169		10*						5.0			
3N172	P	M				0.4*						3.5			
3N173	P	M				10*						3.5			
3N174	P	M	2N4352	2N4352		5.0*	.0025					4.0			
3N175	N	M				5.0*	0.2					5.0			
3N176	N	M				10*	0.2					5.0			
3N177	N	M				25*	0.2					7.0			
3N178	P	M				0.5*	0.2					3.5			
3N179	P	M				1.0*						4.5			
3N180	P	M				1.0*						5.0			
3N181	P	M				0.5*						25			
3N182	P	M				2.5*						25			
3N183	P	M				10*						30			
3N184	P	M				2.0*						9.0			
3N185	P	M				5.0*						10			
3N186	P	M				10*						11			
3N188	P	M				0.2*						4.5			
3N189	P	M				0.2*						4.5			
3N190	P	M				0.2*	0.01					4.5			
3N191	P	M				0.2*	0.01					4.5			
3N192	N	M			3.0	30	-1.0	-6.0	GSSR	8000	24000	6.0			
3N193	N	M			1.0	20	-1.0	-6.0	GSSR	6000	22000	7.0			
3N200	N	J			0.5	12	-50	6.5	GSS						Dual
3N201	N	J			6.0	30	-10	6.0	GSS	8.0	20		4.5	200M	Dual
3N202	N	J			6.0	30	-10	6.0	GSS	8.0	20		4.5	200M	Dual
3N203	N	J			3.0	15	-10	6.0	GSS	7.0	15		6.0	45M	Dual
3N204	N	S			6.0	30	10	30	GSS	10*	22*		3.5		Dual
3N205	N	S			6.0	30	10	30	GSS	10*	22*				Dual
3N206	N	S			3.0	15	10	30	GSS	7	17*		4.0		Dual
3N207	P	S				10*	200					4.0			Dual
3N208	P	S				10*	1.0	30	GSSF			4.0			Dual
3N211	N	S			6.0	40	10	-6.0	GSS	17*	40*		3.5	45M	Dual
3N212	N	S			6.0	40	10	-6.0	GSS	17*	40*		3.5	45M	Dual
3N213	N	S			6.0	40	10	-6.0	GSS	17*	40*		3.5	45M	Dual
3N214	S	N					10	7.0	GSS			6.0			
3N215	S	N					10	7.0	GSS			6.0			
3N216	S	N					10	7.0	GSS			6.0			
3N217	S	N					10	7.0	GSS			6.0			
3N218	P					20*						50			

TABLE 9 - PROGRAMMABLE UNIJUNCTION TRANSISTORS (PUT)-INDEX

KEY

Type	Ref.	I_P		I_{GAO}	I_V		V_{GKF}	P_F	V_O	V_F @ I_F		I_T	I_{TRM}	T_{stg}
		R_G = 10 kΩ µA Max	R_G = 1.0 MΩ µA Max	@ 40 V nA Max	R_G = 10 kΩ µA Min	R_G = 1.0MΩ µA Max	Volts Max	mW	Volts Min	Volts	mA	mA Max	20 µs *10 µs 1.0% DC Amp Max	°C

Type	Numerical Listings of 2N Registered Type Numbers ***Available from Motorola**
Ref.	First type number on data sheet where the EIA type or replacement part is located
I_P	Peak Current
I_{GAO}	Gate to Anode Leakage Current
I_V	Valley Current
V_{GKF}	Gate to Cathode Forward Voltage
P_F	Forward Power Dissipation @ 25°C
V_O	Peak Output Voltage
V_F @ I_F	Forward Voltage
I_T	DC Forward Anode Current
I_{TRM}	Repetitive Peak Forward Current
T_{stg}	Storage Temperature Range

PROGRAMMABLE UNIJUNCTION TRANSISTORS (PUT)-INDEX

2N6027-2N6138

Type	Ref.	I_P		I_{GAO}	I_V		V_{GKF}	P_F	V_O	V_F @ I_F		I_T	I_{TRM}	T_{stg}
		R_G = 10 kΩ µA Max	R_G = 1.0 MΩ µA Max	@ 40 V nA Max	R_G = 10 kΩ µA Min	R_G = 1.0MΩ µA Max	Volts Max	mW	Volts Min	Volts	mA	mA Max	20 µs *10 µs 1.0% DC Amp Max	°C
*2N6027	2N6027	5.0	2.0	10	70	50	40	300	6.0	1.5	50	150	2.0	-55to
*2N6028	2N6027	1.0	0.15	10	25	25	40	300	6.0	1.5	50	150	2.0	+150°C
*2N6116	2N6116	5.0	2.0	5.0	70	50	40	250	6.0	1.5	50	200	2.0	-65°C
*2N6117	2N6116	2.0	0.3	5.0	50	50	40	250	6.0	1.5	50	200	2.0	to
*2N6118	2N6116	1.0	0.15	5.0	50	25	40	250	6.0	1.5	50	200	2.0	+200°C
2N6119		5.0	2.0	10	70	50	40	400	9.0	1.0	50	300	8.0*	-55°C to
2N6120		1.0	0.15	10	25	25	40	400	9.0	1.0	50	300	8.0*	+150°C
2N6137		5.0	2.0	10	70	50	40	400	9.0	1.0	50	300	8.0*	-55°C to
2N6138		5.0	2.0	10	70	50	100	400	9.0	1.0	50	300	8.0*	+150°C

TABLE 10 - UNIJUNCTION TRANSISTORS INDEX

This table contains a numerical listing and short-form specifications for unijunction transistors with EIA-registered 2N numbers.

KEY

TYPE	REPLACEMENT	REFERENCE	P_D mW	R_{BB} KΩ		η		I_V mA Min	I_P µA Max	I_{EO} @V_{B2E} µA@V Max	$V_{EB1(sat)}$ @ I_E = 50mA Volts
				Min	Max	Min	Max				
Numerical Listing of Registered Type Numbers *Available from Motorola	Type number of recommended replacement or nearest electrical equivalent	First type number on data sheet where the EIA type or replacement part is located.	Power Dissipation @ 25°C	Interbase Resistance		Intrinsic Standoff Ratio		Valley Current	Peak Point Current	Emitter Reverse Current at indicated V_{B2E}	Emitter Saturation Voltage

UNIJUNCTION TRANSISTORS INDEX

TYPE	REPLACEMENT	REFERENCE	P_D mW	R_{BB} KΩ Min	Max	η Min	Max	I_V mA Min	I_P μA Max	I_{EO} @V_{B2E} μA@V Max	$V_{EB1(sat)}$ @I_E =50mA Volts
2N489			450	6.8		0.62		8.0	20	12 @ 60	5.0
2N489A			450	6.8		0.62		8.0	15	12 @ 60	4.0
2N489B			450	6.8		0.62		8.0	6.0	0.2 @ 60	4.0
2N490			450	9.1		0.62		8.0	20	12 @ 60	5.0
2N490A			450	9.1		0.62		8.0	15	12 @ 60	4.0
2N490B			450	9.1		0.62		8.0	6.0	0.2 @ 60	4.0
2N490C			450	9.1		0.51					
2N491			450	6.8		0.68		8.0	20	12 @ 60	5.0
2N491A			450	6.8		0.68		8.0	15	12 @ 60	4.3
2N491B			450	6.8		0.68		8.0	6.0	0.2 @ 60	4.3
2N492			450	9.1		0.68		8.0	20	12 @ 60	5.0
2N492A			450	9.1		0.68		8.0	15	12 @ 60	4.3
2N492B			450	9.1		0.68		8.0	6.0	0.2 @ 60	4.3
2N492C			450	9.1		0.56					
2N493			450	6.8		0.75		8.0	20	12 @ 60	5.0
2N493A			450	6.8		0.75		8.0	15		
2N493B			450	6.8		0.75		8.0	6.0	0.2 @ 60	5.0
2N494			450	9.1		0.75		8.0	20	12 @ 60	5.0
2N494A			450	9.1		0.75		8.0	15	12 @ 60	4.6
2N494B			450	9.1		0.75		8.0	6.0	0.2 @ 60	4.6
2N494C			450	9.1		0.62		8.0	2.0	0.02 @ 60	4.6
2N1671			450	9.1		0.62		8.0	25	12 @ 30	5.0
2N1671A			450	9.1		0.62		8.0	25	12 @ 30	5.0
2N1671B			450	9.1		0.62		8.0	6.0	0.2 @ 30	5.0
2N1671C			450	4.1-9.1							
2N2160			450	4.0-12		0.47-0.80		8.0	25	12 @ 30	
2N2417			390	0.68		0.62		8.0	20	12 @ 60	5.0
2N2417A			390	0.68		0.62		8.0	20	12 @ 60	4.0
2N2417B			300	6.8		0.51-0.62		8.0	6.0	0.2 @ 30	4.0
2N2418			390	0.68		0.62		8.0	20	12 @ 60	5.0
2N2418A			390	9.1		0.62		8.0	20	12 @ 60	4.0
2N2418B			300	9.1		0.51-0.62		8.0	6.0	0.2 @ 60	4.0
2N2419			390	4.7-6.8		0.68		8.0	20	12 @ 60	5.0
2N2419A			390	6.8		0.68		8.0	20	12 @ 60	4.3
2N2419B			300	6.8		0.56-0.68		8.0	6.0	0.2 @ 30	4.3
2N2420			390	9.1		0.68		8.0	20	12 @ 60	5.0
2N2420A			390	9.1		0.68		8.0	20	12 @ 60	4.3
2N2420B			300	9.1		0.56-0.68		8.0	6.0	0.2 @ 30	4.3
2N2421			390	6.8		0.75		8.0	20	12 @ 60	5.0
2N2421A			390	6.8		0.75		8.0	20	12 @ 60	4.6
2N2421B			300	6.8		0.62-0.75		0.2	6.0	0.2 @ 30	4.6
2N2422			390	9.1		0.75		8.0	20	12 @ 60	5.0
2N2422A			390	9.1		0.75		8.0	20	12 @ 60	4.6
2N2422B			300	9.1		0.62-0.75		8.0	6.0	0.2 @ 30	
★2N2646		2N2646	300	4.7		0.56		4.0	25	12 @ 30	2.0
★2N2647		2N2646	300	4.7		0.68		8.0	2.0	0.2 @ 30	2.0
2N2840			300	4.7-9.1		0.4-0.85		0.70	10	1.0 @ 30	
2N3406			450					8.0			
2N3479			400	4.7-9.1		0.47-0.62		6.0	20	12 @ 30	5.0
2N3480			400	9.1		0.75		4.0	15	12 @ 30	5.0
2N3481			400	9.1		0.85		6.0	15	12 @ 30	5.0
2N3482			400	4.7-6.8		0.51-0.62		8.0	2.0	0.02 @ 30	5.0
2N3483			400	9.1		0.72		8.0	2.0	1.0 @ 30	5.0
2N3484			400	9.1		0.85		8.0	2.0	0.2 @ 30	5.0
2N3679			250	9.1		0.80		4.2			
★2N3980		2N3980	360	8.0							
★2N4851		2N4851	300	4.7		0.56		2.0	2.0	0.1 @ 30	2.5
★2N4852		2N4851	300	4.7		0.70		4.0	2.0	0.1 @ 30	2.5
★2N4853		2N4851	300	4.7		0.70		6.0	0.4	0.05 @ 30	2.5
★2N4870		2N4870	300	4.0		0.56		2.0	5.0	0.05 @ 30	2.5
★2N4871		2N4870	300	4.0		0.70		4.0	5.0	0.05 @ 30	2.5
2N4891	MU4891	MU4891	300	4.0		0.55		2.0	5.0	0.01 @ 30	4.0
2N4892	MU4892	MU4891	300	4.0		0.51		4.0	2.0	0.01 @ 30	4.0
2N4893	MU4893	MU4891	300	4.0		0.55		2.0	2.0	0.01 @ 30	4.0
2N4894	MU4894	MU4891	300	4.0		0.74		2.0	1.0	0.01 @ 30	4.0
2N4947			360	4.0-9.1		0.51-0.69		4.0	2.0	0.01 @ 30	2.5
2N4948		2N4948	360	4.0		0.55		2.0	2.0	0.01 @ 30	2.5
2N4949		2N4948	360	4.0		0.74		2.0	1.0	0.01 @ 30	2.5
2N5431		2N5431	360	6.0-8.5		0.72-0.80		2.0	4.0		3.0
★2N6114		2N6114	300	5.5/8.2		0.58/0.62		1.0	5.0	0.01 5.0	1.5
★2N6115		2N6114	300	5.0/2.5		0.58/0.62		1.0	15	0.1 5.0	1.5

TABLE 6 - OPTOELECTRONIC DEVICE INDEX

The following table provides a numerical index and short-form specifications for EIA-registered 4N type numbers.

KEY

TYPE	MATERIAL	POLARITY	REFERENCE	USE	P_D @25°C	REF. POINT	T_J °C	$I_{C(on)}$ mA Min	$V_{CE(sat)}$ Volts Max	V_{ISO} Volts Min	$t_r + t_f$ μs Max	Frequency Response kHz Typ
Numerical Listings of 4N Numbers ***Available from Motorola**	S – Silicon GA – Gallium Arsenide	N – NPN P – PNP	First type number on data sheet where the EIA type part is located.	PT – Photo Transistors OC – Optical Coupler	Power Dissipation at 25°C Units: M – milliwatts W – watts	Ref. Point: A – Ambient C – Case	Maximum Operating Junction Temperature	On-State Collector Current	Collector-Emitter Saturation Voltage	Isolation Voltage	t_r = Rise Time t_f = Fall Time	Frequency Response

OPTOELECTRONIC DEVICE INDEX

4N22-4N33

TYPE	MATERIAL	POLARITY	REFERENCE	USE	P_D @25°C	REF. POINT	T_J °C	$I_{C(on)}$ mA Min	$V_{CE(sat)}$ Volts Max	V_{ISO} Volts Min	$t_r + t_f$ μs Max	Frequency Response kHz Typ
4N22	S	N		PT	300M	C		2.5	0.3		30	
4N23	S	N		PT	300M	C		6.0	0.3		30	
4N24	S	N		PT	300M	C		10*	0.3		40	
* 4N25	GA	N	4N25	OC	250M	A	100	2.0*	0.5	2500	7.8	300
* 4N26	GA	N	4N25	OC	250M	A	100	2.0*	0.5	1500	7.8	300
* 4N27	GA	N	4N25	OC	250M	A	100	1.0*	0.5	1500	5.0	300
* 4N28	GA	N	4N25	OC	250M	A	100	1.0*	0.5	500	5.0	300
* 4N29	GA	N	4N29	OC	150M	A	100	10*	1.0	2500		
* 4N30	GA	N	4N29	OC	150M	A	100	10*	1.0	1500		
* 4N31	GA	N	4N29	OC	150M	A	100	5.0*	1.2	1500		
* 4N32	GA	N	4N29	OC	150M	A	100	50*	10	2500		
* 4N33	GA	N	4N29	OC	150M	A	100	50*	10	1500		

$^*I_F$ =10mA

IN-HOUSE NON-REGISTERED DEVICES

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GLOSSARY

The following glossary of Motorola prefixes and a brief description of non-registered device types is presented to aid the reader.

PREFIX	DESCRIPTION
1/4M	Diode — Zener
.4M	Diode — Zener
1M	Diode — Zener
1.5M	Diode — Zener
5M	Diode — Zener
10M	Diode — Zener
50M	Diode — Zener
BB	Diode — Tuning (Varactor)
BU	Transistor — Si Power
MA	Transistor — Ge Milliwatt
MAC	Thyristor — (Triac)
MBD	Diode — Hot Carrier
MBI	Diode — Micro-I — Hot Carrier
MBS	Bidirectional Switch (Trigger)
MC	Integrated Circuit — Linear/Digital
MCA	Reference Amplifier Assembly
MCB	Integrated Circuit — Beam Lead Flat Pack
MCBC	Integrated Circuit — Beam Lead Chip
MCC	Integrated Circuit — Digital/Linear Chip
MCCF	Integrated Circuit — Linear Functional Circuit Chip
MCE	Integrated Circuit — Dielectrically Isolated
MCH	Integrated Circuit — Linear Hybrid Power
MCL	Diode — Current Limiting
MCM	Integrated Circuit — Memories
MCR	Thyristor (Silicon Controlled Rectifier)
MD	Transistor — Dual Metal Can (Multiple Device)
MDA	Assemblies — Rectifier Assemblies — Diode
MFC	Functional Circuit — Digital/Linear
MFE	Transistor — Field-Effect — Metal Can
MH	Transistor — Mounting Hardware
MHQ	Transistor — Ceramic Quad Dual-In-Line
MHW	Transistor — RF and Microwave Hybrids
MJ	Transistor — Si Power
MJC	Unencapsulated Si Power
MJE	Transistor — Si Power — Plastic
MK	Transistor — Mounting Kit
MLED	Optoelectronics — Light-Emitting Diode
MLM	Integrated Circuit — Linear Monolithic

GLOSSARY (continued)

PREFIX	DESCRIPTION
MM	Transistor — Small-Signal Transistor — RF Power
MMCD	Unencapsulated — Si Switching Diodes
MMCF	Unencapsulated — Flip-Chip Small-Signal
MMCFD	Unencapsulated Flip-Chip Diode
MMCM	Transistor — Micro-T Small-Signal (Ceramic)
MMCQ	Unencapsulated Thin-Film Capacitors
MMCRA	Unencapsulated — Thin-Film Resistors
MMCS	Unencapsulated — Small-Signal Transistors
MMD	Diode — Switching
MMF	Transistor — Field-Effect Matched Pair
MMT	Transistor — Micro-T Small-Signal (Plastic)
MOR	Optoelectronics — Readout
MP	Transistor — Ge Power
MPF	Transistor — Field-Effect — Plastic
MPI	Diode — Micro-I PIN (Switching)
MPM	Transistor — Small-Signal Plastic
MPN	Diode — PIN (Switching)
MPQ	Transistor — Plastic Quad Dual In-Line
MPS	Transistor — Plastic Small-Signal
MPS-A	↓
MPS-H	↓
MPS-K	↓ (Kits)
MPS-L	↓
MPS-U	↓ (Uniwatt)
MPT	Trigger — Plastic Bilateral
MPU	Transistor — Programmable Unijunction
MPZ	Transient Suppressor (Power Zener Diode)
MQ	Transistor — Quad Flat Pack
MR	Rectifier
MRA	Rectifier — Power
MRD	Optoelectronics (Photo, Transistor, Detector, Diode)
MRF	Transistor, RF and Microwave
MS	Transistor — Heat Sink
MSD	Diode — Dual — Plastic TO-92
MU	Transistor — Unijunction
MUS	Transistor — Unidirectional Switch
MV	Diode — Tuning (Varactor)
MVI	Diode — Micro-I Tuning (Varactor)
MVS	Voltage Stabilizer Diode
MZ	Diode — Zener
MZC	Unencapsulated — Diode — Zener

TABLE 11 - DIODE, RECTIFIER INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house, non-registered rectifiers, zener diodes, signal diodes and reference diodes.

KEY

TYPE NO.	MATERIAL	REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
				V_{RWM} Volts	**V_F Volts**	**I_O Amp**	**I_R mA**	**I_{FSM} Amp**	**V_Z Nom Volts**	**I_{ZT} mA**	**Tol V_Z±%**	**P_D**
				SIGNAL DIODES					REFERENCE DIODES			
				PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C

Numerical Listing of Registered Type Numbers

S – Silicon
G – Germanium
A – Gallium Arsenide
E – Selenium

First type number on data sheet where the part number is located

RECTIFIERS
SHOWN IN BOLD TYPE

V_{RWM} – Peak Working Reverse Voltage

V_F – Forward Voltage Drop (Average and Peak values shown without distinction)

I_O – Average Forward Current Rating

I_R – Average Reverse Current

I_{FSM} – Peak Surge Current

ZENER DIODES
SHOWN IN BOLD TYPE

V_Z(Nom) – Nominal Zener Breakdown Voltage

I_{ZT} – Test Current for Zener Voltage

Tol – Tolerance for Specified Nominal Zener Breakdown Voltage

P_D – Maximum Power Dissipation
m – mW
W – W

SIGNAL DIODES
SHOWN IN LIGHT TYPE

PRV – Peak Reverse Voltage

V_F @ I_F – Maximum Forward Voltage at Indicated Forward Current,
A – Ampere
m – mA

I_R – Reverse Current –
m – mA
n – nA
* – µA

t_{rr} – Reverse Recovery Time

REFERENCE DIODES
SHOWN IN LIGHT TYPE

V_Z(Nom) – Nominal Zener Breakdown Voltage

T_C – Average Temperature Coefficient over Temperature Range

I_{ZT} – Test Current for Zener Voltage

Temp Range – Operating Range of Average T_C

The Codes Listed Below Identify The Type of Products.

CODE	PRODUCT	CODE	PRODUCT
3	3-layer (diac)	I	Current Regulator
4	4-layer Diode	J	Hot-Carrier (Schottky) Signal Diode
A	Assembly	M	Microwave/UHF Diode
B	Backward Diode	P	Power Transient Suppressor
C	Clipper	R	Reference Diode
D	Light Detector	S	Signal Diode, General Purpose
E	Light-Emitter	T	Tunnel Diode
F	Fast Recovery Rectifier	V	Varactor
G	General-Purpose Rectifier	Z	Zener Diode
H	Hot-Carrier (Schottky) Rectifier		

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1/4M2.4AZ	S		1/4M2.4AZ	Z						2.4	10	20	.25
1/4M2.7AZ	S		1/4M2.4AZ	Z						2.7	10	20	.25
1/4M3.0AZ	S		1/4M2.4AZ	Z						3.0	10	20	.25
1/4M3.3AZ	S		1/4M2.4AZ	Z						3.3	10	20	.25
1/4M3.6AZ	S		1/4M2.4AZ	Z						3.6	10	20	.25
1/4M3.9AZ	S		1/4M2.4AZ	Z						3.9	10	20	.25
1/4M4.3AZ	S		1/4M2.4AZ	Z						4.3	10	20	.25
1/4M4.7AZ	S		1/4M2.4AZ	Z						4.7	10	20	.25
1/4M5.1AZ	S		1/4M2.4AZ	Z						5.1	10	20	.25
1/4M5.6AZ	S		1/4M2.4AZ	Z						5.6	10	20	.25
1/4M6.2AZ	S		1/4M2.4AZ	Z						6.2	10	20	.25
1/4M6.8Z	S		1/4M2.4AZ	Z						6.8	9.2	20	.25
1/4M7.5Z	S		1/4M2.4AZ	Z						7.5	8.3	20	.25
1/4M8.2Z	S		1/4M2.4AZ	Z						8.2	7.6	20	.25
1/4M9.1Z	S		1/4M2.4AZ	Z						9.1	6.9	20	.25
1/4M10Z	S		1/4M2.4AZ	Z						10	6.3	20	.25
1/4M11Z	S		1/4M2.4AZ	Z						11	5.7	20	.25
1/4M12Z	S		1/4M2.4AZ	Z						12	5.2	20	.25
1/4M13Z	S		1/4M2.4AZ	Z						13	4.8	20	.25
1/4M14Z	S		1/4M2.4AZ	Z						14	4.5	20	.25
1/4M15Z	S		1/4M2.4AZ	Z						15	4.2	20	.25
1/4M16Z	S		1/4M2.4AZ	Z						16	3.9	20	.25
1/4M17Z	S		1/4M2.4AZ	Z						17	3.7	20	.25
1/4M18Z	S		1/4M2.4AZ	Z						18	3.5	20	.25
1/4M19Z	S		1/4M2.4AZ	Z						19	3.3	20	.25
1/4M20Z	S		1/4M2.4AZ	Z						20	3.1	20	.25
1/4M22Z	S		1/4M2.4AZ	Z						22	2.8	20	.25
1/4M24Z	S		1/4M2.4AZ	Z						24	2.6	20	.25
1/4M25Z	S		1/4M2.4AZ	Z						25	2.5	20	.25
1/4M27Z	S		1/4M2.4AZ	Z						27	2.3	20	.25
1/4M30Z	S		1/4M2.4AZ	Z						30	2.1	20	.25
1/4M33Z	S		1/4M2.4AZ	Z						33	1.9	20	.25
1/4M36Z	S		1/4M2.4AZ	Z						36	1.7	20	.25
1/4M39Z	S		1/4M2.4AZ	Z						39	1.6	20	.25
1/4M43Z	S		1/4M2.4AZ	Z						43	1.5	20	.25
1/4M45Z	S		1/4M2.4AZ	Z						45	1.4	20	.25
1/4M47Z	S		1/4M2.4AZ	Z						47	1.3	20	.25
1/4M50Z	S		1/4M2.4AZ	Z						50	1.2	20	.25
1/4M52Z	S		1/4M2.4AZ	Z						52	1.2	20	.25
1/4M56Z	S		1/4M2.4AZ	Z						56	1.1	20	.25
1/4M62Z	S		1/4M2.4AZ	Z						62	1.0	20	.25
1/4M68Z	S		1/4M2.4AZ	Z						68	0.92	20	.25
1/4M75Z	S		1/4M2.4AZ	Z						75	0.83	20	.25
1/4M82Z	S		1/4M2.4AZ	Z						82	0.76	20	.25
1/4M91Z	S		1/4M2.4AZ	Z						91	0.69	20	.25
1/4M100Z	S		1/4M2.4AZ	Z						100	0.63	20	.25
1/4M105Z	S		1/4M2.4AZ	Z						105	0.60	20	.25
1/4M110Z	S		1/4M2.4AZ	Z						110	0.57	20	.25
1/4M120Z	S		1/4M2.4AZ	Z						120	0.52	20	.25
1/4M130Z	S		1/4M2.4AZ	Z						130	0.48	20	.25
1/4M140Z	S		1/4M2.4AZ	Z						140	0.45	20	.25
1/4M150Z	S		1/4M2.4AZ	Z						150	0.42	20	.25
1/4M175Z	S		1/4M2.4AZ	Z						175	0.36	20	.25
1/4M200Z	S		1/4M2.4AZ	Z						200	0.31	20	.25
.4M64FR10	S			S	6.0	1.0	100m	0.1	0.2				
.4M1.36FR2	S			S	6.0	1.0	100m	0.1	0.2				
.4M2.04FR5	S			S	6.0	1.0	100m	0.1	0.2				
.4M2.04FR2	S			S	6.0	1.0	100m	0.1	0.2				
1M3.3AZ10	S		1N3821	Z						3.3	76	10	1.0
1M3.6AZ10	S		1N3821	Z						3.6	69	10	1.0
1M3.9AZ10	S		1N3821	Z						3.9	64	10	1.0
1M4.3AZ10	S		1N3821	Z						4.3	58	10	1.0
1M4.7AZ10	S		1N3821	Z						4.7	53	10	1.0
1M5.1AZ10	S		1N3821	Z						5.1	49	10	1.0
1M5.6AZ10	S		1N3821	Z						5.6	45	10	1.0
1M6.2AZ10	S		1N3821	Z						6.2	41	10	1.0
1M6.8AZ10	S		1N3821	Z						6.8	37	10	1.0
1M7.5AZ10	S		1N3821	Z						7.5	34	10	1.0
1M6.8Z	S		1N3821	Z						6.8	37	10	1.0
1M7.5Z	S		1N3821	Z						7.5	34	10	1.0

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1M8.2Z	S		1N3821	Z						8.2	31	10	1.0
1M9.1Z	S		1N3821	Z						9.1	28	10	1.0
1M10Z	S		1N3821	Z						10	25	10	1.0
1M11Z	S		1N3821	Z						11	23	10	1.0
1M12Z	S		1N3821	Z						12	21	10	1.0
1M13Z	S		1N3821	Z						13	19	10	1.0
1M15Z	S		1N3821	Z						15	17	10	1.0
1M16Z	S		1N3821	Z						16	15.5	10	1.0
1M18Z	S		1N3821	Z						18	14	10	1.0
1M20Z	S		1N3821	Z						20	12.5	10	1.0
1M22Z	S		1N3821	Z						22	11.5	10	1.0
1M24Z	S		1N3821	Z						24	10.5	10	1.0
1M27Z	S		1N3821	Z						27	9.5	10	1.0
1M30Z	S		1N3821	Z						30	8.5	10	1.0
1M33Z	S		1N3821	Z						33	7.5	10	1.0
1M36Z	S		1N3821	Z						36	7.0	10	1.0
1M39Z	S		1N3821	Z						39	6.5	10	1.0
1M43Z	S		1N3821	Z						43	6.0	10	1.0
1M47Z	S		1N3821	Z						47	5.5	10	1.0
1M51Z	S		1N3821	Z						51	5.0	10	1.0
1M56Z	S		1N3821	Z						56	4.5	10	1.0
1M62Z	S		1N3821	Z						62	4.0	10	1.0
1M68Z	S		1N3821	Z						68	3.7	10	1.0
1M75Z	S		1N3821	Z						75	3.3	10	1.0
1M82Z	S		1N3821	Z						82	3.0	10	1.0
1M91Z	S		1N3821	Z						91	2.8	10	1.0
1M100Z	S		1N3821	Z						100	2.5	10	1.0
1M110Z	S		1N3821	Z						110	2.3	10	1.0
1M120Z	S		1N3821	Z						120	2.0	10	1.0
1M130Z	S		1N3821	Z						130	1.9	10	1.0
1M150Z	S		1N3821	Z						150	1.7	10	1.0
1M160Z	S		1N3821	Z						160	1.6	10	1.0
1M180Z	S		1N3821	Z						180	1.4	10	1.0
1M200Z	S		1N3821	Z						200		10	1.0
1M3.3ZS10	S		1N4728	Z						3.3	76	10	1.0
1M3.6ZS10	S		1N4728	Z						3.6	69	10	1.0
1M3.9ZS10	S		1N4728	Z						3.9	64	10	1.0
1M4.3ZS10	S		1N4728	Z						4.3	58	10	1.0
1M4.7ZS10	S		1N4728	Z						4.7	53	10	1.0
1M5.1ZS10	S		1N4728	Z						5.1	49	10	1.0
1M5.6ZS10	S		1N4728	Z						5.6	45	10	1.0
1M6.2ZS10	S		1N4728	Z						6.2	41	10	1.0
1M6.8ZS10	S		1N4728	Z						6.8	37	10	1.0
1M7.5ZS10	S		1N4728	Z						7.5	34	10	1.0
1M8.2ZS10	S		1N4728	Z						8.2	31	10	1.0
1M9.1ZS10	S		1N4728	Z						9.1	28	10	1.0
1M10ZS10	S		1N4728	Z						10	25	10	1.0
1M11ZS10	S		1N4728	Z						11	23	10	1.0
1M12ZS10	S		1N4728	Z						12	21	10	1.0
1M13ZS10	S		1N4728	Z						13	19	10	1.0
1M15ZS10	S		1N4728	Z						15	17	10	1.0
1M16ZS10	S		1N4728	Z						16	15.5	10	1.0
1M18ZS10	S		1N4728	Z						18	14	10	1.0
1M20ZS10	S		1N4728	Z						20	12.5	10	1.0
1M22ZS10	S		1N4728	Z						22	11.5	10	1.0
1M24ZS10	S		1N4728	Z						24	10.5	10	1.0
1M27ZS10	S		1N4728	Z						27	9.5	10	1.0
1M30ZS10	S		1N4728	Z						30	8.5	10	1.0
1M33ZS10	S		1N4728	Z						33	7.5	10	1.0
1M36ZS10	S		1N4728	Z						36	7.0	10	1.0
1M39ZS10	S		1N4728	Z						39	6.5	10	1.0
1M43ZS10	S		1N4728	Z						43	6.0	10	1.0
1M47ZS10	S		1N4728	Z						47	5.5	10	1.0
1M51ZS10	S		1N4728	Z						51	5.0	10	1.0
1M56ZS10	S		1N4728	Z						56	4.5	10	1.0
1M62ZS10	S		1N4728	Z						62	4.0	10	1.0
1M68ZS10	S		1N4728	Z						68	3.7	10	1.0
1M75ZS10	S		1N4728	Z						75	3.3	10	1.0
1M82ZS10	S		1N4728	Z						82	3.0	10	1.0
1M91ZS10	S		1N4728	Z						91	2.8	10	1.0

DIODE, RECTIFIER INDEX

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
1M100ZS10	S		1N4728	Z						100	2.5	10	1.0
1M110ZS10	S		1N4728	Z						110	2.3	10	1.0
1M120ZS10	S		1N4728	Z						120	2.0	10	1.0
1M130ZS10	S		1N4728	Z						130	1.9	10	1.0
1M150ZS10	S		1N4728	Z						150	1.7	10	1.0
1M160ZS10	S		1N4728	Z						160	1.6	10	1.0
1M180ZS10	S		1N4728	Z						180	1.4	10	1.0
1M200ZS10	S		1N4728	Z						200	1.2	10	1.0
MPZ5-16A	S		MPZ5-16	Z						14	400		350
MPZ5-16B	S		MPZ5-16	Z						14	400		350
MPZ5-32A	S		MPZ5-16	Z						28	400		350
MPZ5-32B	S		MPZ5-16	Z						28	400		350
MPZ5-32C	S		MPZ5-16	Z						28	400		350
MPZ5-180A	S		MPZ5-16	Z						165	400		350
MPZ5-180B	S		MPZ5-16	Z						165	400		350
MPZ5-180C	S		MPZ5-16	Z						165	400		350
MR1-1200	S		MR1-1200	G	1200	1.1	1.0	10*	30				
MR1-1400	S		MR1-1200	G	1400	1.1	1.0	10*	30				
MR1-1600	S		MR1-1200	G	1600	1.1	1.0	10*	30				
MR501	S		MR501	G	100	1.0	3.0	5.0*	100				
MR502	S		MR501	G	200	1.0	3.0	5.0*	100				
MR504	S		MR501	G	400	1.0	3.0	5.0*	100				
MR506	S		MR501	G	600	1.0	3.0	5.0*	100				
MR508	S		MR501	G	800	1.0	3.0	5.0*	100				
MR510	S		MR501	G	1000	1.0	3.0	5.0*	100				
MR810	S		MR810	F	50	1.1	1.0	0.01	30				
MR811	S		MR810	F	100	1.1	1.0	0.01	30				
MR812	S		MR810	F	200	1.1	1.0	0.01	30				
MR813	S		MR810	F	300	1.1	1.0	0.01	30				
MR814	S		MR810	F	400	1.1	1.0	0.01	30				
MR816	S		MR810	F	500	1.1	1.0	0.01	30				
MR817	S		MR810	F	800	1.1	1.0	0.01	30				
MR818	S		MR810	F	1000	1.1	1.0	0.01	30				
MR820	S		MR820	F	50	1.0	5.0	0.25	300				
MR821	S		MR820	F	100	1.0	5.0	0.25	300				
MR822	S		MR820	F	200	1.0	5.0	0.25	300				
MR824	S		MR820	F	400	1.0	5.0	0.25	300				
MR826	S		MR820	F	600	1.0	5.0	0.25	300				
MR830	S		MR830	F	50	1.1	3.0	0.05	100				
MR831	S		MR830	F	100	1.1	3.0	0.05	100				
MR832	S		MR830	F	200	1.1	3.0	0.05	100				
MR834	S		MR830	F	400	1.1	3.0	0.05	100				
MR836	S		MR830	F	600	1.1	3.0	0.05	100				
MR840	S		MR830	F	50	1.2	3.0	0.075	100				
MR841	S		MR830	F	100	1.2	3.0	0.075	100				
MR842	S		MR830	F	200	1.2	3.0	0.075	100				
MR844	S		MR830	F	400	1.2	3.0	0.075	100				
MR846	S		MR830	F	600	1.2	3.0	0.075	100				
MR850	S		MR850	F	50	1.25	3.0	0.01	100				
MR851	S		MR850	F	100	1.25	3.0	0.01	100				
MR852	S		MR850	F	200	1.25	3.0	0.01	100				
MR854	S		MR850	F	400	1.25	3.0	0.01	100				
MR856	S		MR850	F	600	1.25	3.0	0.01	100				
MR860	S		MR860	F	50	1.4	40	0.05	350				
MR861	S		MR860	F	100	1.4	40	0.05	350				
MR862	S		MR860	F	200	1.4	40	0.05	350				
MR864	S		MR860	F	400	1.4	40	0.05	350				
MR866	S		MR860	F	600	1.4	40	0.05	350				
MR870	S		MR870	F	50	1.4	50	0.05	400				
MR871	S		MR870	F	100	1.4	50	0.05	400				
MR872	S		MR870	F	200	1.4	50	0.05	400				
MR874	S		MR870	F	400	1.4	50	0.05	400				
MR876	S		MR870	F	600	1.4	50	0.05	400				
MR990A	S		MR990A	G	1000	1.7	0.25	0.1	15				
MR991A	S		MR990A	G	1500	1.7	0.25	0.1	15				
MR992A	S		MR990A	G	2000	1.7	0.25	0.1	15				
MR993A	S		MR990A	G	2500	1.7	0.25	0.1	15				
MR994A	S		MR990A	G	3000	1.7	0.25	0.1	15				
MR995A	S		MR990A	G	4000	1.7	0.25	0.1	15				
MR996A	S		MR990A	G	5000	1.7	0.25	0.1	15				

MR1120-MR1337-3

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
MR1120	S		MR1120	G	50	1.0	12	0.5	300				
MR1121	S		MR1120	G	100	1.0	12	0.5	300				
MR1122	S		MR1120	G	200	0.55	12	0.5	300				
MR1123	S		MR1120	G	300	0.55	12	0.5	300				
MR1124	S		MR1120	G	400	0.55	12	0.5	300				
MR1125	S		MR1120	G	500	0.55	12	0.5	300				
MR1126	S		MR1120	G	600	0.55	12	0.5	300				
MR1128	S		MR1120	G	800	0.55	12	0.5	300				
MR1130	S		MR1120	G	1000	0.55	12	0.5	300				
MR1200	S		MR1200	G	50	0.4	50	10	500				
MR1201	S		MR1200	G	100	0.4	50	10	500				
MR1202	S		MR1200	G	150	0.4	50	10	500				
MR1203	S		MR1200	G	200	0.4	50	10	500				
MR1204	S		MR1200	G	250	0.4	50	10	500				
MR1205	S		MR1200	G	300	0.4	50	10	500				
MR1206	S		MR1200	G	350	0.4	50	10	500				
MR1207	S		MR1200	G	400	0.4	50	10	500				
MR1210	S		MR1210	G	50	0.4	80	15	2000				
MR1211	S		MR1210	G	100	0.4	80	15	2000				
MR1212	S		MR1210	G	150	0.4	80	15	2000				
MR1213	S		MR1210	G	200	0.4	80	15	2000				
MR1214	S		MR1210	G	250	0.4	80	15	2000				
MR1215	S		MR1210	G	300	0.4	80	15	2000				
MR1216	S		MR1210	G	350	0.4	80	15	2000				
MR1217	S		MR1210	G	400	0.4	80	15	2000				
MR1218	S		MR1210	G	500	0.4	80	15	2000				
MR1219	S		MR1210	G	600	0.4	80	15	2000				
MR1220	S		MR1220	G	50	0.4	160	20	3600				
MR1221	S		MR1220	G	100	0.4	160	20	3600				
MR1222	S		MR1220	G	150	0.4	160	20	3600				
MR1223	S		MR1220	G	200	0.4	160	20	3600				
MR1224	S		MR1220	G	250	0.4	160	20	3600				
MR1225	S		MR1220	G	300	0.4	160	20	3600				
MR1226	S		MR1220	G	350	0.4	160	20	3600				
MR1227	S		MR1220	G	400	0.4	160	20	3600				
MR1230	S		MR1230	G	50	0.4	240	35	5000				
MR1231	S		MR1230	G	100	0.4	240	35	5000				
MR1232	S		MR1230	G	150	0.4	240	35	5000				
MR1233	S		MR1230	G	200	0.4	240	35	5000				
MR1234	S		MR1230	G	250	0.4	240	35	5000				
MR1235	S		MR1230	G	300	0.4	240	35	5000				
MR1236	S		MR1230	G	350	0.4	240	35	5000				
MR1237	S		MR1230	G	400	0.4	240	35	5000				
MR1240	S		MR1240	G	50	0.4	400	50	8000				
MR1241	S		MR1240	G	100	0.4	400	50	8000				
MR1242	S		MR1240	G	150	0.4	400	50	8000				
MR1243	S		MR1240	G	200	0.4	400	50	8000				
MR1244	S		MR1240	G	250	0.4	400	50	8000				
MR1245	S		MR1240	G	300	0.4	400	50	8000				
MR1246	S		MR1240	G	350	0.4	400	50	8000				
MR1247	S		MR1240	G	400	0.4	400	50	8000				
MR1260	S		MR1260	G	50	0.4	650	100	12000				
MR1261	S		MR1260	G	100	0.4	650	100	12000				
MR1262	S		MR1260	G	150	0.4	650	100	12000				
MR1263	S		MR1260	G	200	0.4	650	100	12000				
MR1264	S		MR1260	G	250	0.4	650	100	12000				
MR1265	S		MR1260	G	300	0.4	650	100	12000				
MR1266	S		MR1260	G	350	0.4	650	100	12000				
MR1267	S		MR1260	G	400	0.4	650	100	12000				
MR1290	S		MR1290	G	50	0.4	1000	200	18000				
MR1291	S		MR1290	G	100	0.4	1000	200	18000				
MR1292	S		MR1290	G	150	0.4	1000	200	18000				
MR1293	S		MR1290	G	200	0.4	1000	200	18000				
MR1294	S		MR1290	G	250	0.4	1000	200	18000				
MR1295	S		MR1290	G	300	0.4	1000	200	18000				
MR1296	S		MR1290	G	350	0.4	1000	200	18000				
MR1297	S		MR1290	G	400	0.4	1000	200	18000				
MR1337-1	S		MR1337	F	50	1.1	1000	0.25	30				
MR1337-2	S		MR1337	F	100	1.1	1000	0.25	30				
MR1337-3	S		MR1337	F	200	1.1	1000	0.25	30				

DIODE, RECTIFIER INDEX

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS V_{RWM} Volts	V_F Volts	I_0 Amp	I_R mA	I_{FSM} Amp	ZENER DIODES V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES PRV Volts	V_F Volts	@ I_F	I_R	t_{rr} μs	REFERENCE DIODES V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
MR1337-4	S		MR1337	F	300	1.1	1000	0.25	30				
MR1337-5	S		MR1337	F	400	1.1	1000	0.25	30				
MR1366	S		1N4933	F	600	1.2	6.0	0.015	150				
MR1376	S		1N4933	F	600	1.4	12	0.015	200				
MR1386	S		1N4933	F	600	1.4	20	0.025	250				
MR1396	S		1N4933	F	600	1.4	30	0.025	300				
MR1810	S		MR1210	G	50	0.4	80	15	2000				
MR1811	S		MR1210	G	100	0.4	80	15	2000				
MR1812	S		MR1210	G	150	0.4	80	15	2000				
MR1813	S		MR1210	G	200	0.4	80	15	2000				
MR1814	S		MR1210	G	250	0.4	80	15	2000				
MR1815	S		MR1210	G	300	0.4	80	15	2000				
MR1816	S		MR1210	G	350	0.4	80	15	2000				
MR1817	S		MR1210	G	400	0.4	80	15	2000				
MR1818	S		MR1210	G	500	0.4	80	15	2000				
MR1819	S		MR1210	G	600	0.4	80	15	2000				
MR2064	S		MR2064	G	50	1.2	1.0	25	30				
MR2065	S		MR2064	G	100	1.2	1.0	25	30				
MR2066	S		MR2064	G	200	1.2	1.0	25	30				
MR2067	S		MR2064	G	400	1.2	1.0	25	30				
MR2068	S		MR2064	G	600	1.2	1.0	25	30				
MR2069	S		MR2069	G	50								
MR2070	S		MR2069	G	100	0.5	3.0	1.0	300				
MR2071	S		MR2069	G	200	0.5	3.0	1.0	300				
MR2072	S		MR2069	G	300	0.5	3.0	1.0	300				
MR2073	S		MR2069	G	400	0.5	3.0	1.0	300				
MR2074	S		MR2069	G	500	0.5	3.0	1.0	300				
MR2075	S		MR2069	G	600	0.5	3.0	1.0	300				
MR2080HA	S		MR2084HA	A	50	0.5	750	4.0	12000				
MR2081HA	S		MR2084HA	A	100	0.5	750	4.0	12000				
MR2082HA	S		MR2084HA	A	200	0.5	750	4.0	12000				
MR2083HA	S		MR2084HA	A	300	0.5	750	4.0	12000				
MR2084HA	S		MR2084HA	A	400	0.5	750	4.0	12000				
MR2100HA	S		MR2100HA	A	50	0.5	1100	5.0	18000				
MR2101HA	S		MR2100HA	A	100	0.5	1100	5.0	18000				
MR2102HA	S		MR2100HA	A	200	0.5	1100	5.0	18000				
MR2103HA	S		MR2100HA	A	300	0.5	1100	5.0	18000				
MR2104HA	S		MR2100HA	A	400	0.5	1100	5.0	18000				
MR2261	S		MR2261	G	10	1.5	25	1.0	300				
MR2262	S		MR2261	G	20	1.5	25	1.0	300				
MR2263	S		MR2261	G	30	1.5	25	1.0	300				
MR2264	S		MR2261	G	40	1.5	25	1.0	300				
MR2265	S		MR2261	G	50	1.5	25	1.0	300				
MR2266	S		MR2261	G	800	1.1	1.0	0.01	30				
MR2271	S		MR2271	G	300	1.1	1.0	0.025	30				
MR2272	S		MR2272	G	400	1.1	1.0	0.01	30				
MR2273	S		MR2266	G	200	1.1	1.0	0.01	30				
MR2369	S		MR2369	G	50	1.0	3.0	1.0	300				
MR2370	S		MR2369	G	100	1.0	3.0	1.0	300				
MR2371	S		MR2369	G	200	1.0	3.0	1.0	300				
MR2372	S		MR2369	G	300	1.0	3.0	1.0	300				
MR2373	S		MR2369	G	400	1.0	3.0	1.0	300				
MR2374	S		MR2369	G	500	1.0	3.0	1.0	300				
MR2375	S		MR2369	G	600	1.0	3.0	1.0	300				
MR5005	S		MR5005	G	50	1.18	50	0.2	600				
MR5010	S		MR5005	G	100	1.18	50	0.2	600				
MR5020	S		MR5005	G	200	1.18	50	0.2	600				
MR5030	S		MR5005	G	300	1.18	50	0.2	600				
MR5040	S		MR5005	G	400	1.18	50	0.2	600				
MR9600	S		MR9600	G	25	1.3	0.8	0.5	15				
MR9601	S		MR9600	G	50	1.3	0.8	0.5	15				
MR9602	S		MR9600	G	100	1.3	0.8	0.5	15				
MR9603	S		MR9600	G	200	1.3	0.8	0.5	15				
MR9604	S		MR9600	G	400	1.3	0.8	0.5	15				
MRA130	S		MRA130	A	50	0.5	150	1.5	3000				
MRA131	S		MRA130	A	100	0.5	150	1.5	3000				
MRA132	S		MRA130	A	200	0.5	150	1.5	3000				
MRA133	S		MRA130	A	300	0.5	150	1.5	3000				
MRA134	S		MRA130	A	400	0.5	150	1.5	3000				
MRA160	S		MRA160	A	50	0.5	300	3.0	6000				

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
MRA161	S		MRA160	A	100	0.5	300	3.0	6000				
MRA162	S		MRA160	A	200	0.5	300	3.0	6000				
MRA163	S		MRA160	A	300	0.5	300	3.0	6000				
MRA164	S		MRA160	A	400	0.5	300	3.0	6000				
MRA330	S		MRA330	A	50	0.5	100	1.0	2000				
MRA331	S		MRA330	A	100	0.5	100	1.0	2000				
MRA332	S		MRA330	A	200	0.5	100	1.0	2000				
MRA333	S		MRA330	A	300	0.5	100	1.0	2000				
MRA334	S		MRA330	A	400	0.5	100	1.0	2000				
MRA360	S		MRA360	A	50	0.5	220	3.0	5000				
MRA361	S		MRA360	A	100	0.5	220	3.0	5000				
MRA362	S		MRA360	A	200	0.5	220	3.0	5000				
MRA363	S		MRA360	A	300	0.5	220	3.0	5000				
MRA364	S		MRA360	A	400	0.5	220	3.0	5000				
MSD6100	S		MSD6100	S	100	0.7	200	5.0	500				
MSD6101	S		MSD6101	S	50	0.57	200	0.1	500				
MSD6102	S		MSD6102	S	70	1.0	200	0.1	500				
MSD6150	S		MSD6150	S	70	1.0	200	0.1	500				
MSD7000	S		MSD7000	S	100	0.55			500				
MVS460	S		MVS460							33*		18	
MZ70-2.4	S		MZ70-2.4	Z						2.4	20	10	0.4
MZ70-2.5	S		MZ70-2.4	Z						2.5	20	10	0.4
MZ70-2.7	S		MZ70-2.4	Z						2.7	20	10	0.4
MZ70-2.8	S		MZ70-2.4	Z						2.8	20	10	0.4
MZ70-3.0	S		MZ70-2.4	Z						3.0	20	10	0.4
MZ70-3.3	S		MZ70-2.4	Z						3.3	20	10	0.4
MZ70-3.6	S		MZ70-2.4	Z						3.6	20	10	0.4
MZ70-3.9	S		MZ70-2.4	Z						3.9	20	10	0.4
MZ70-4.3	S		MZ70-2.4	Z						4.3	20	10	0.4
MZ70-4.7	S		MZ70-2.4	Z						4.7	20	10	0.4
MZ70-5.1	S		MZ70-2.4	Z						5.1	20	10	0.4
MZ70-5.6	S		MZ70-2.4	Z						5.6	20	10	0.4
MZ70-6.0	S		MZ70-2.4	Z						6.0	20	10	0.4
MZ70-6.2	S		MZ70-2.4	Z						6.2	20	10	0.4
MZ70-6.8	S		MZ70-2.4	Z						6.8	20	10	0.4
MZ70-7.5	S		MZ70-2.4	Z						7.5	20	10	0.4
MZ70-8.2	S		MZ70-2.4	Z						8.2	20	10	0.4
MZ70-8.7	S		MZ70-2.4	Z						8.7	20	10	0.4
MZ70-9.1	S		MZ70-2.4	Z						9.1	20	10	0.4
MZ70-10	S		MZ70-2.4	Z						10	20	10	0.4
MZ70-11	S		MZ70-2.4	Z						11	20	10	0.4
MZ70-12	S		MZ70-2.4	Z						12	20	10	0.4
MZ70-13	S		MZ70-2.4	Z						13	9.5	10	0.4
MZ70-14	S		MZ70-2.4	Z						14	9.0	10	0.4
MZ70-15	S		MZ70-2.4	Z						15	8.5	10	0.4
MZ70-16	S		MZ70-2.4	Z						16	7.8	10	0.4
MZ70-17	S		MZ70-2.4	Z						17	7.4	10	0.4
MZ70-18	S		MZ70-2.4	Z						18	7.0	10	0.4
MZ70-19	S		MZ70-2.4	Z						19	6.6	10	0.4
MZ70-20	S		MZ70-2.4	Z						20	6.2	10	0.4
MZ70-22	S		MZ70-2.4	Z						22	5.6	10	0.4
MZ70-24	S		MZ70-2.4	Z						24	5.2	10	0.4
MZ70-25	S		MZ70-2.4	Z						25	5.0	10	0.4
MZ70-27	S		MZ70-2.4	Z						27	4.6	10	0.4
MZ70-28	S		MZ70-2.4	Z						28	4.5	10	0.4
MZ70-30	S		MZ70-2.4	Z						30	4.2	10	0.4
MZ70-33	S		MZ70-2.4	Z						33	3.8	10	0.4
MZ70-36	S		MZ70-2.4	Z						36	3.4	10	0.4
MZ70-39	S		MZ70-2.4	Z						39	3.2	10	0.4
MZ70-43	S		MZ70-2.4	Z						43	3.0	10	0.4
MZ70-47	S		MZ70-2.4	Z						47	2.7	10	0.4
MZ70-51	S		MZ70-2.4	Z						51	2.5	10	0.4
MZ70-56	S		MZ70-2.4	Z						56	2.2	10	0.4
MZ70-60	S		MZ70-2.4	Z						60	2.1	10	0.4
MZ70-62	S		MZ70-2.4	Z						62	2.0	10	0.4
MZ70-68	S		MZ70-2.4	Z						68	1.8	10	0.4
MZ70-75	S		MZ70-2.4	Z						75	1.7	10	0.4
MZ70-82	S		MZ70-2.4	Z						82	1.5	10	0.4
MZ70-87	S		MZ70-2.4	Z						87	1.4	10	0.4
MZ70-91	S		MZ70-2.4	Z						91	1.4	10	0.4

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
MZ70-100	S		MZ70-2.4	Z						100	1.3	10	0.4
MZ70-110	S		MZ70-2.4	Z						110	1.1	10	0.4
MZ70-120	S		MZ70-2.4	Z						120	1.0	10	0.4
MZ70-130	S		MZ70-2.4	Z						130	0.95	10	0.4
MZ70-140	S		MZ70-2.4	Z						140	0.90	10	0.4
MZ70-150	S		MZ70-2.4	Z						150	0.85	10	0.4
MZ70-160	S		MZ70-2.4	Z						160	0.80	10	0.4
MZ70-170	S		MZ70-2.4	Z						170	0.74	10	0.4
MZ70-180	S		MZ70-2.4	Z						180	0.68	10	0.4
MZ70-190	S		MZ70-2.4	Z						190	0.66	10	0.4
MZ70-200	S		MZ70-2.4	Z						200	0.65	10	0.4
MZ500-1	S		MZ500-1	Z						2.4	20		0.4
MZ500-2	S		MZ500-1	Z						2.7	20		0.4
MZ500-3	S		MZ500-1	Z						3.0	20		0.4
MZ500-4	S		MZ500-1	Z						3.3	20		0.4
MZ500-5	S		MZ500-1	Z						3.6	20		0.4
MZ500-6	S		MZ500-1	Z						3.9	20		0.4
MZ500-7	S		MZ500-1	Z						4.3	20		0.4
MZ500-8	S		MZ500-1	Z						4.7	20		0.4
MZ500-9	S		MZ500-1	Z						5.1	20		0.4
MZ500-10	S		MZ500-1	Z						5.6	20		0.4
MZ500-11	S		MZ500-1	Z						6.2	20		0.4
MZ500-12	S		MZ500-1	Z						6.8	20		0.4
MZ500-13	S		MZ500-1	Z						7.5	20		0.4
MZ500-14	S		MZ500-1	Z						8.2	20		0.4
MZ500-15	S		MZ500-1	Z						9.1	20		0.4
MZ500-16	S		MZ500-1	Z						10	20		0.4
MZ500-17	S		MZ500-1	Z						11	20		0.4
MZ500-18	S		MZ500-1	Z						12	20		0.4
MZ500-19	S		MZ500-1	Z						13	9.5		0.4
MZ500-20	S		MZ500-1	Z						15	8.5		0.4
MZ500-21	S		MZ500-1	Z						16	7.8		0.4
MZ500-22	S		MZ500-1	Z						18	7.0		0.4
MZ500-23	S		MZ500-1	Z						20	6.2		0.4
MZ500-24	S		MZ500-1	Z						22	5.6		0.4
MZ500-25	S		MZ500-1	Z						24	5.2		0.4
MZ500-26	S		MZ500-1	Z						27	4.6		0.4
MZ500-27	S		MZ500-1	Z						30	4.2		0.4
MZ500-28	S		MZ500-1	Z						33	3.8		0.4
MZ500-29	S		MZ500-1	Z						36	3.4		0.4
MZ500-30	S		MZ500-1	Z						39	3.2		0.4
MZ500-31	S		MZ500-1	Z						43	3.0		0.4
MZ500-32	S		MZ500-1	Z						47	2.7		0.4
MZ500-33	S		MZ500-1	Z						51	2.5		0.4
MZ500-34	S		MZ500-1	Z						56	2.2		0.4
MZ500-35	S		MZ500-1	Z						62	2.0		0.4
MZ500-36	S		MZ500-1	Z						68	1.8		0.4
MZ500-37	S		MZ500-1	Z						75	1.7		0.4
MZ500-38	S		MZ500-1	Z						82	1.5		0.4
MZ500-39	S		MZ500-1	Z						91	1.4		0.4
MZ500-40	S		MZ500-1	Z						100	1.3		0.4
MZ1000-1	S		MZ1000-1	Z						3.3	76		1.5
MZ1000-2	S		MZ1000-1	Z						3.6	69		1.5
MZ1000-3	S		MZ1000-1	Z						3.9	64		1.5
MZ1000-4	S		MZ1000-1	Z						4.3	58		1.5
MZ1000-5	S		MZ1000-1	Z						4.7	53		1.5
MZ1000-6	S		MZ1000-1	Z						5.1	49		1.5
MZ1000-7	S		MZ1000-1	Z						5.6	45		1.5
MZ1000-8	S		MZ1000-1	Z						6.2	41		1.5
MZ1000-9	S		MZ1000-1	Z						6.8	37		1.5
MZ1000-10	S		MZ1000-1	Z						7.5	34		1.5
MZ1000-11	S		MZ1000-1	Z						8.2	31		1.5
MZ1000-12	S		MZ1000-1	Z						9.1	28		1.5
MZ1000-13	S		MZ1000-1	Z						10	25		1.5
MZ1000-14	S		MZ1000-1	Z						11	23		1.5
MZ1000-15	S		MZ1000-1	Z						12	21		1.5
MZ1000-16	S		MZ1000-1	Z						13	19		1.5
MZ1000-17	S		MZ1000-1	Z						15	17		1.5
MZ1000-18	S		MZ1000-1	Z						16	15.5		1.5
MZ1000-19	S		MZ1000-1	Z						18	14		1.5

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
MZ1000-20	S		MZ1000-1	Z						20	12.5		1.5
MZ1000-21	S		MZ1000-1	Z						22	11.5		1.5
MZ1000-22	S		MZ1000-1	Z						24	10.5		1.5
MZ1000-23	S		MZ1000-1	Z						27	9.5		1.5
MZ1000-24	S		MZ1000-1	Z						30	8.5		1.5
MZ1000-25	S		MZ1000-1	Z						33	7.5		1.5
MZ1000-26	S		MZ1000-1	Z						36	7.0		1.5
MZ1000-27	S		MZ1000-1	Z						39	6.5		1.5
MZ1000-28	S		MZ1000-1	Z						43	6.0		1.5
MZ1000-29	S		MZ1000-1	Z						47	5.5		1.5
MZ1000-30	S		MZ1000-1	Z						51	5.0		1.5
MZ1000-31	S		MZ1000-1	Z						56	4.5		1.5
MZ1000-32	S		MZ1000-1	Z						62	4.0		1.5
MZ1000-23	S		MZ1000-1	Z						68	3.7		1.5
MZ1000-34	S		MZ1000-1	Z						75	3.3		1.5
MZ1000-35	S		MZ1000-1	Z						82	3.0		1.5
MZ1000-36	S		MZ1000-1	Z						91	2.8		1.5
MZ1000-37	S		MZ1000-1	Z						100	2.5		1.5
MZ4614	S		1N4099	Z						1.8	0.25	5.0	0.25
MZ4615	S		1N4099	Z						2.0	0.25	5.0	0.25
MZ4616	S		1N4099	Z						2.2	0.25	5.0	0.25
MZ4617	S		1N4099	Z						2.4	0.25	5.0	0.25
MZ4618	S		1N4099	Z						2.7	0.25	5.0	0.25
MZ4619	S		1N4099	Z						3.0	0.25	5.0	0.25
MZ4620	S		1N4099	Z						3.3	0.25	5.0	0.25
MZ4621	S		1N4099	Z						3.6	0.25	5.0	0.25
MZ4622	S		1N4099	Z						3.9	0.25	5.0	0.25
MZ4623	S		1N4099	Z						4.3	0.25	5.0	0.25
MZ4624	S		1N4099	Z						4.7	0.25	5.0	0.25
MZ4625	S		1N4099	Z						5.1	0.25	5.0	0.25
MZ4626	S		1N4099	Z						5.6	0.25	5.0	0.25
MZ4627	S		1N4099	Z						6.2	0.25	5.0	0.25
MZC2.4A10	S		MZC2.4A10	Z						2.4	21	10	5.0
MZC2.5A10	S		MZC2.4A10	Z						2.5	20	10	5.0
MZC2.7A10	S		MZC2.4A10	Z						2.7	19	10	5.0
MZC2.8A10	S		MZC2.4A10	Z						2.8	18	10	5.0
MZC3.0A10	S		MZC2.4A10	Z						3.0	17	10	5.0
MZC3.3A10	S		MZC2.4A10	Z						3.3	15	10	5.0
MZC3.6A10	S		MZC2.4A10	Z						3.6	14	10	5.0
MZC3.9A10	S		MZC2.4A10	Z						3.9	13	10	5.0
MZC4.3A10	S		MZC2.4A10	Z						4.3	12	10	5.0
MZC4.7A10	S		MZC2.4A10	Z						4.7	11	10	5.0
MZC5.1A10	S		MZC2.4A10	Z						5.1	9.8	10	5.0
MZC5.6A10	S		MZC2.4A10	Z						5.6	8.9	10	5.0
MZC6.0A10	S		MZC2.4A10	Z						6.0	8.3	10	5.0
MZC6.2A10	S		MZC2.4A10	Z						6.2	8.1	10	5.0
MZC6.8A10	S		MZC2.4A10	Z						6.8	7.3	10	5.0
MZC7.5A10	S		MZC2.4A10	Z						7.5	6.7	10	5.0
MZC8.2A10	S		MZC2.4A10	Z						8.2	6.1	10	5.0
MZC8.7A10	S		MZC2.4A10	Z						8.7	5.7	10	5.0
MZC9.1A10	S		MZC2.4A10	Z						9.1	5.5	10	5.0
MZC10A10	S		MZC2.4A10	Z						10	5.0	10	5.0
MZC11A10	S		MZC2.4A10	Z						11	4.5	10	5.0
MZC12A10	S		MZC2.4A10	Z						12	4.2	10	5.0
MZC13A10	S		MZC2.4A10	Z						13	3.8	10	5.0
MZC14A10	S		MZC2.4A10	Z						14	3.6	10	5.0
MZC15A10	S		MZC2.4A10	Z						15	3.1	10	5.0
MZC16A10	S		MZC2.4A10	Z						16	2.9	10	5.0
MZC17A10	S		MZC2.4A10	Z						17	2.8	10	5.0
MZC18A10	S		MZC2.4A10	Z						18	2.6	10	5.0
MZC19A10	S		MZC2.4A10	Z						19	2.5	10	5.0
MZC20A10	S		MZC2.4A10	Z						20	2.3	10	5.0
MZC22A10	S		MZC2.4A10	Z						22	2.1	10	5.0
MZC24A10	S		MZC2.4A10	Z						24	2.0	10	5.0
MZC25A10	S		MZC2.4A10	Z						25	1.9	10	5.0
MZC27A10	S		MZC2.4A10	Z						27	1.8	10	5.0
MZC28A10	S		MZC2.4A10	Z						28		10	5.0
MZC30A10	S		MZC2.4A10	Z						30	1.7	10	5.0
MZC33A10	S		MZC2.4A10	Z						33	1.5	10	5.0
MZC36A10	S		MZC2.4A10	Z						36	1.4	10	5.0

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} µs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
MZC39A10	S		MZC2.4A10	Z						39	1.3	10	5.0
MZC43A10	S		MZC2.4A10	Z						43	1.2	10	5.0
MZC47A10	S		MZC2.4A10	Z						47	1.1	10	5.0
MZC51A10	S		MZC2.4A10	Z						51	0.98	10	5.0
MZC56A10	S		MZC2.4A10	Z						56	0.89	10	5.0
MZC60A10	S		MZC2.4A10	Z						60	0.83	10	5.0
MZC62A10	S		MZC2.4A10	Z						62	0.81	10	5.0
MZC68A10	S		MZC2.4A10	Z						68	0.74	10	5.0
MZC75A10	S		MZC2.4A10	Z						75	0.67	10	5.0
MZC82A10	S		MZC2.4A10	Z						82	0.61	10	5.0
MZC87A10	S		MZC2.4A10	Z						87	0.57	10	5.0
MZC91A10	S		MZC2.4A10	Z						91	0.55	10	5.0
MZC100A10	S		MZC2.4A10	Z						100	0.50	10	5.0
MZC110A10	S		MZC2.4A10	Z						110	0.45	10	5.0
MZC120A10	S		MZC2.4A10	Z						120	0.42	10	5.0
MZC130A10	S		MZC2.4A10	Z						130	0.38	10	5.0
MZC140A10	S		MZC2.4A10	Z						140	0.36	10	5.0
MZC150A10	S		MZC2.4A10	Z						150	0.33	10	5.0
MZC160A10	S		MZC2.4A10	Z						160	0.31	10	5.0
MZC170A10	S		MZC2.4A10	Z						170	0.29	10	5.0
MZC180A10	S		MZC2.4A10	Z						180	0.28	10	5.0
MZC190A10	S		MZC2.4A10	Z						190	0.26	10	5.0
MZC200A10	S		MZC2.4A10	Z						200	0.25	10	5.0
MZC1.8B10	S		MZC2.4A10	Z						1.8		10	5.0
MZC2.0B10	S		MZC2.4A10	Z						2.0		10	5.0
MZC2.2B10	S		MZC2.4A10	Z						2.2		10	5.0
MZC2.4B10	S		MZC2.4A10	Z						2.4		10	5.0
MZC2.7B10	S		MZC2.4A10	Z						2.7		10	5.0
MZC3.0B10	S		MZC2.4A10	Z						3.0		10	5.0
MZC3.3B10	S		MZC2.4A10	Z						3.3		10	5.0
MZC3.6B10	S		MZC2.4A10	Z						3.6		10	5.0
MZC3.9B10	S		MZC2.4A10	Z						3.9		10	5.0
MZC4.3B10	S		MZC2.4A10	Z						4.3		10	5.0
MZC4.7B10	S		MZC2.4A10	Z						4.7		10	5.0
MZC5.1B10	S		MZC2.4A10	Z						5.1		10	5.0
MZC5.6B10	S		MZC2.4A10	Z						5.6		10	5.0
MZC6.2B10	S		MZC2.4A10	Z						6.2		10	5.0
MZC6.8B10	S		MZC2.4A10	Z						6.8		10	5.0
MZC7.5B10	S		MZC2.4A10	Z						7.5		10	5.0
MZC8.2B10	S		MZC2.4A10	Z						8.2		10	5.0
MZC8.7B10	S		MZC2.4A10	Z						8.7		10	5.0
MZC9.1B10	S		MZC2.4A10	Z						9.1		10	5.0
MZC10B10	S		MZC2.4A10	Z						10		10	5.0
MZC11B10	S		MZC2.4A10	Z						11		10	5.0
MZC12B10	S		MZC2.4A10	Z						12		10	5.0
MZC13B10	S		MZC2.4A10	Z						13		10	5.0
MZC14B10	S		MZC2.4A10	Z						14		10	5.0
MZC15B10	S		MZC2.4A10	Z						15		10	5.0
MZC16B10	S		MZC2.4A10	Z						16		10	5.0
MZC17B10	S		MZC2.4A10	Z						17		10	5.0
MZC18B10	S		MZC2.4A10	Z						18		10	5.0
MZC19B10	S		MZC2.4A10	Z						19		10	5.0
MZC20B10	S		MZC2.4A10	Z						20		10	5.0
MZC22B10	S		MZC2.4A10	Z						22		10	5.0
MZC24B10	S		MZC2.4A10	Z						24		10	5.0
MZC25B10	S		MZC2.4A10	Z						25		10	5.0
MZC27B10	S		MZC2.4A10	Z						27		10	5.0
MZC28B10	S		MZC2.4A10	Z						28		10	5.0
MZC30B10	S		MZC2.4A10	Z						30		10	5.0
MZC33B10	S		MZC2.4A10	Z						33		10	5.0
MZC36B10	S		MZC2.4A10	Z						36		10	5.0
MZC39B10	S		MZC2.4A10	Z						39		10	5.0
MZC43B10	S		MZC2.4A10	Z						43		10	5.0
MZC47B10	S		MZC2.4A10	Z						47		10	5.0
MZC51B10	S		MZC2.4A10	Z						51		10	5.0
MZC56B10	S		MZC2.4A10	Z						56		10	5.0
MZC60B10	S		MZC2.4A10	Z						60		10	5.0
MZC62B10	S		MZC2.4A10	Z						62		10	5.0
MZC68B10	S		MZC2.4A10	Z						68		10	5.0
MZC75B10	S		MZC2.4A10	Z						75		10	5.0

MZC82B10-MZC200B10

TYPE NO.	MATERIAL		REFERENCE	IDENTIFICATION	RECTIFIERS					ZENER DIODES			
					V_{RWM} Volts	V_F Volts	I_O Amp	I_R mA	I_{FSM} Amp	V_Z Nom Volts	I_{ZT} mA	Tol V_Z ±%	P_D Watts
					SIGNAL DIODES					REFERENCE DIODES			
					PRV Volts	V_F Volts @	I_F	I_R	t_{rr} μs	V_Z Nom Volts	T_C %/°C	I_{ZT} mA	Temp Range °C
MZC82B10	S		MZC2.4A10	Z						82		10	5.0
MZC87B10	S		MZC2.4A10	Z						87		10	5.0
MZC91B10	S		MZC2.4A10	Z						91		10	5.0
MZC100B10	S		MZC2.4A10	Z						100		10	5.0
MZC110B10	S		MZC2.4A10	Z						110		10	5.0
MZC120B10	S		MZC2.4A10	Z						120		10	5.0
MZC130B10	S		MZC2.4A10	Z						130		10	5.0
MZC140B10	S		MZC2.4A10	Z						140		10	5.0
MZC150B10	S		MZC2.4A10	Z						150		10	5.0
MZC160B10	S		MZC2.4A10	Z						160		10	5.0
MZC170B10	S		MZC2.4A10	Z						170		10	5.0
MZC180B10	S		MZC2.4A10	Z						180		10	5.0
MZC190B10	S		MZC2.4A10	Z						190		10	5.0
MZC200B10	S		MZC2.4A10	Z						200		10	5.0

TABLE 12 - RECTIFIER ASSEMBLIES INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered rectifier assemblies.

KEY

TYPE	MATERIAL	REFERENCE	V_{RRM} Volts	I_{FSM} Amp	I_{FRM} Amp	I_O Amp @ °C
Alpha-numerical Listings	S – Silicon	First type number on data sheet where the part number is located.	Peak Repetitive Reverse Voltage	Peak Surge Current	Peak Forward Current	DC Output Current

MDA920-1-MDA972-5

TYPE	MATERIAL	REFERENCE	V_{RRM} Volts	I_{FSM} Amp	I_{FRM} Amp	I_O Amp @	°C
MDA920-1	S	MDA920	25	32	5.0	1.0	75
MDA920-2	S	MDA920	50	32	5.0	1.0	75
MDA920-3	S	MDA920	100	32	5.0	1.0	75
MDA920-4	S	MDA920	200	32	5.0	1.0	75
MDA920-5	S	MDA920	300	32	5.0	1.0	75
MDA920-6	S	MDA920	400	32	5.0	1.0	75
MDA920-7	S	MDA920	600	32	5.0	1.0	75
MDA922-1	S	MDA922-1	25	60		1.8	55
MDA922-2	S	MDA922-1	50	60		1.8	55
MDA922-3	S	MDA922-1	100	60		1.8	55
MDA922-4	S	MDA922-1	200	60		1.8	55
MDA922-5	S	MDA922-1	300	60		1.8	55
MDA922-6	S	MDA922-1	400	60		1.8	55
MDA922-7	S	MDA922-1	600	60		1.8	55
MDA922-8	S	MDA922-1	800	60		1.8	55
MDA922-9	S	MDA922-1	1000	60		1.8	55
MDA930-1	S	MDA920	25	32	5.0	0.5	75
MDA930-2	S	MDA920	50	32	5.0	0.5	75
MDA930-3	S	MDA920	100	32	5.0	0.5	75
MDA930-4	S	MDA920	200	32	5.0	0.5	75
MDA930-5	S	MDA920	300	32	5.0	0.5	75
MDA930-6	S	MDA920	400	32	5.0	0.5	75
MDA930-7	S	MDA920	600	32	5.0	0.5	75
MDA940-1	S	MDA920	25	32	5.0	1.0	75
MDA940-2	S	MDA920	50	32	5.0	1.0	75
MDA940-3	S	MDA920	100	32	5.0	1.0	75
MDA940-4	S	MDA920	200	32	5.0	1.0	75
MDA940-5	S	MDA920	300	32	5.0	1.0	75
MDA940-6	S	MDA920	400	32	5.0	1.0	75
MDA940-7	S	MDA920	600	32	5.0	1.0	75
MDA942-1	S	MDA942	50	25	6.0	1.5	55
MDA942-2	S	MDA942	100	25	6.0	1.5	55
MDA942-3	S	MDA942	200	25	6.0	1.5	55
MDA942-4	S	MDA942	300	25	6.0	1.5	55
MDA942-5	S	MDA942	400	25	6.0	1.5	55
MDA942-6	S	MDA942	600	25	6.0	1.5	55
MDA950-1	S	MDA920	25	32	5.0	1.0	75
MDA950-2	S	MDA920	50	32	5.0	1.0	75
MDA950-3	S	MDA920	100	32	5.0	1.0	75
MDA950-4	S	MDA920	200	32	5.0	1.0	75
MDA950-5	S	MDA920	300	32	5.0	1.0	75
MDA950-6	S	MDA920	400	32	5.0	1.0	75
MDA950-7	S	MDA920	600	32	5.0	1.0	75
MDA952-1	S	MDA942	50	150	35	6.0	55
MDA952-2	S	MDA942	100	150	35	6.0	55
MDA952-3	S	MDA942	200	150	35	6.0	55
MDA952-4	S	MDA942	300	150	35	6.0	55
MDA952-5	S	MDA942	400	150	35	6.0	55
MDA952-6	S	MDA942	600	150	35	6.0	55
MDA952FR-1	S	MDA952FR-1	50	150		6.0	55
MDA952FR-2	S	MDA952FR-1	100	150		6.0	55
MDA952FR-3	S	MDA952FR-1	200	150		6.0	55
MDA952FR-4	S	MDA952FR-1	300	150		6.0	55
MDA952FR-5	S	MDA952FR-1	400	150		6.0	55
MDA60-1	S	MDA960	50	100	15	2.5	55
MDA60-2	S	MDA960	100	100	15	2.5	55
MDA960-3	S	MDA960	200	100	15	2.5	55
MDA962-1	S	MDA960	50	250	60	10	55
MDA962-2	S	MDA942	100	250	60	10	55
MDA962-3	S	MDA942	200	250	60	10	55
MDA962-4	S	MDA942	300	250	60	10	55
MDA962-5	S	MDA942	400	250	60	10	55
MDA970-1	S	MDA960	50	150	25	4.0	55
MDA970-2	S	MDA960	100	150	25	4.0	55
MDA970-3	S	MDA960	200	150	25	4.0	55
MDA972-1	S	MDA942	35	250	60	16	55
MDA972-2	S	MDA942	70	250	60	16	55
MDA972-3	S	MDA942	140	250	60	16	55
MDA972-4	S	MDA942	210	250	60	16	55
MDA972-5	S	MDA942	280	250	60	16	55

TYPE	MATERIAL	REFERENCE	V_{RRM} Volts	I_{FSM} Amp	I_{FRM} Amp	I_O Amp	@ °C
MDA980-1	S	MDA980-1	50	300		12	55
MDA980-2	S	MDA980-1	100	300		12	55
MDA980-3	S	MDA980-1	200	300		12	55
MDA980-4	S	MDA980-1	300	300		12	55
MDA980-5	S	MDA980-1	400	300		12	55
MDA980-6	S	MDA980-1	600	300		12	55
MDA990-1	S	MDA980-1	50	300		27	55
MDA990-2	S	MDA980-1	100	300		27	55
MDA990-3	S	MDA980-1	200	300		27	55
MDA990-4	S	MDA980-1	300	300		27	55
MDA990-5	S	MDA980-1	400	300		27	55
MDA990-6	S	MDA980-1	600	300		27	55
MDA1330H	S	MDA1330H	5000	25		1.0	40
MDA1331H	S	MDA1330H	10000	25		1.0	40
MDA1332H	S	MDA1330H	5000	250		2.5	40
MDA1333H	S	MDA1330H	10000	250		2.5	40
MDA1491-1	S	MDA942	50	25	6.0	1.5	55
MDA1491-2	S	MDA942	100	25	6.0	1.5	55
MDA1491-3	S	MDA942	200	25	6.0	1.5	55
MDA1491-4	S	MDA942	300	25	6.0	1.5	55
MDA1491-5	S	MDA942	400	25	6.0	1.5	55
MDA1491-6	S	MDA942	600	25	6.0	1.5	55
MDA1505-1	S	MDA942	50	200	45	8.0	55
MDA1505-2	S	MDA942	100	200	45	8.0	55
MDA1505-3	S	MDA942	200	200	45	8.0	55
MDA1505-4	S	MDA942	300	200	45	8.0	55
MDA1505-5	S	MDA942	400	200	45	8.0	55
MDA1505-6	S	MDA942	600	200	45	8.0	55
MDA1591-1	S	MDA942	50	100	25	4.0	55
MDA1591-2	S	MDA942	100	100	25	4.0	55
MDA1591-3	S	MDA942	200	100	25	4.0	55
MDA1591-4	S	MDA942	300	100	25	4.0	55
MDA1591-5	S	MDA942	400	100	25	4.0	55
MDA1591-6	S	MDA942	600	100	25	4.0	55

TABLE 13 - HOT-CARRIER RECTIFIERS INDEX

This table contains an alpha numerical listing and short-form specifications for Motorola in-house non-registered hot-carrier rectifiers.

KEY

TYPE	REFERENCE	V_{RRM} Volts	I_O Amp	I_{FSM} Amp	I_R TC=25°C mA	V_F @ $I_{FM} = I_O$ TC=25°C Volts
Alpha-Numerical Listing	First type number on data sheet where the part number is located	Peak Repetitive Reverse Voltage	DC Output Current	Non-Repetitive Peak Surge Current	Reverse Current	Peak Forward Voltage

HOT-CARRIER RECTIFIERS INDEX

TYPE	REFERENCE	V_{RRM} Volts	I_O Amp	I_{FSM} Amp	I_R TC=25°C mA	V_F @ $I_{FM} = I_O$ TC=25°C Volts
MBR320M	MBR320M	20	15	500	10	0.45
MBR330M	MBR320M	30	15	500	10	0.45
MBR340M	MBR320M	40	15	500	10	0.45
MBR1520	MBR1520	20	15	500	10	0.55
MBR1530	MBR1520	30	15	500	10	0.55
MBR1540	MBR1520	40	15	500	10	0.55
MBR2520	MBR2520	20	25	800	20	0.55
MBR2530	MBR2520	30	25	800	20	0.55
MBR2540	MBR2520	40	25	800	20	0.55
MBR4020	MBR4020	20	40	800	20	0.63
MBR4030	MBR4020	40	30	800	20	0.63
MBR4040	MBR4020	40	40	800	20	0.63

TABLE 14 - HOT-CARRIER DIODES and MICRO-I HOT-CARRIER DIODE INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered hot-carrier diodes and MICRO-I hot-carrier diode.

KEY

Type	Ref.	$V_{(BR)R}$ $I_R = 10\mu A$ Volts min	C_T $V_R = 0V$, f = 1.0MHz(1) $V_R = 20V$, f = 1.0MHz(2) pF Max	I_R $V_R = 3.0V$(3) $V_R = 25V$(4) $V_R = 35V$(5) µA Max	V_F $I_F = 10mA$ Volts Max	NF dB Max	τ ps Max
Alpha-numerical Listing	First type number on data sheet where the part number is located	Reverse Breakdown Voltage	Diode Capacitance	Reverse Leakage Current	Forward Voltage	Noise Figure	Minority Carrier Lifetime

HOT-CARRIER DIODES and MICRO-I HOT-CARRIER DIODE INDEX

TYPE	REFERENCE	$V_{(BR)R}$ $I_R = 10\mu A$ Volts min	C_T $V_R = 0V$, f = 1.0MHz(1) $V_R = 20V$, f = 1.0MHz(2) pF Max	I_R $V_R = 3.0V$(3) $V_R = 25V$(4) $V_R = 35V$(5) µA Max	V_F $I_F = 10mA$ Volts Max	NF dB Max	τ ps Max
MBD101	MBD101	4.0	1.0(1)	0.25(3)	0.6	7.0	
MBD102	MBD102	4.0	1.0(1)	0.25(3)	0.6	7.0	
MBD501	MBD501	50	1.0(2)	0.20(4)	1.2		100
MBD502	MBD502	50	1.0(2)	0.20(4)	1.2		
MBD701	MBD501	70	1.0(2)	0.20(5)	1.2		100
MBD702	MBD502	70	1.0(2)	0.20(5)	1.2		
*MBI-101	MB1-101	4.0	1.0(1)	0.25(3)	0.6	7.0	

*MICRO-I

TABLE 15 - LIGHT-EMITTING DIODES INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered light-emitting diodes.

KEY

			MAXIMUM RATINGS						ELECTRICAL/OPTICAL CHARACTERISTICS				
									LIGHT OUTPUT				
									B Brightness	CP Candle Power	P_O Radiated		
TYPE	MATERIAL	USE	P_D @ 25°C Watts	Ref. Point	T °C	Ref. Point	V_R Volts	I_F mA	f_L @ I_F mA	mcd @ I_F mA	µW @ I_F mA	λP Å	V_F Volts

Alpha-numerical Listing

GA – Gallium Arsenide
GAP – Gallium Arsenide Phosphide
GP – Gallium Phosphide

VLED – Visible Light-Emitting Diode
ILED – Infrared Light-Emitting Diode

Power Dissipation @ 25°C
Ref. Point: A – Ambient

Maximum Temperature
Ref. Point: J – Junction

Reverse Voltage

Forward Current – Continuous

B – Brightness in Footlamberts

CP – Candlepower in Millicandela

P_O – Power Output Radiated in Microwatts

Peak Emission Wavelength

Forward Voltage

LIGHT-EMITTING DIODES INDEX

TYPE	MATERIAL	USE	MAXIMUM RATINGS						ELECTRICAL/OPTICAL CHARACTERISTICS							
									LIGHT OUTPUT							
									B Brightness		CP Candle Power		P_O Radiated			
			P_D @ 25°C Watts	Ref. Point	T °C	Ref. Point	V_R Volts	I_F mA	f_L	@ I_F mA	mcd	@ I_F mA	µW	@ I_F mA	λP Å	V_F Volts
MLED50	GAP	VLED	0.12	A	85	J	3.0	50	750	20					6600	1.6
MLED55	GAP	VLED	0.12	A	85	J	3.0	50			0.3	20			6600	2.0
MLED60	GA	ILED	0.12	A	85	J	3.0	80					550	50	9000	1.2
MLED90	GA	ILED	0.12	A	85	J	3.0	80					350	50	9000	1.2
MLED92	GA	ILED	.215	A	65	J	3.0	100					150	50	9000	1.2
MLED450	GAP	VLED	0.06	A	65	J	4.0	30							6600	1.6
MLED500	GAP	VLED	.215	A	65	J	4.0	100							6600	2.0
MLED600	GAP	VLED	0.12	A	40	J	4.0	50							6600	2.0
MLED610	GAP	VLED	0.35	A	125	J	4.0	75	1100	50					6600	1.6
MLED640	GAP	VLED	0.1	A	40	J	4.0	60							6600	2.0
MLED655	GAP	VLED	0.1	A	40	J	4.0	60							6600	2.0
MLED750	GP	VLED	0.1	A	85	J	4.0	30							5600	3.0
MLED900	GA	ILED	0.12	A	85	J	3.0	80					550	50	900	1.2
MLED910	GA	ILED	0.35	A	125	J	3.0	150					150	50	900	1.2
MLED930	GA	ILED	0.25	A	125	J	3.0	150					650	100	900	1.2

TABLE 16 - PIN SWITCHING DIODES and MICRO-I PIN SWITCHING DIODES INDEX

The following table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered PIN switching diodes, and Micro-I PIN switching diode.

KEY

TYPE	REFERENCE	$V_{(BR)R}$ $I_R = 10\mu Adc$ Volts Min	R_S $I_F = {}^*10mA$ $I_F = 100mA^{(1)}$ $f = 1.0GHz^{(1)}$ $I_F = 150mA^{(2)}$ $f = 3.0GHz^{(2)}$ ohm Max	C_T $V_R = 20V^{*(3)}$ $V_R = 50V^{(3)}$ $f = 1.0MHz^{(3)}$ $V_R = 250V^{(4)}$ $f = 1.0MHz^{(4)}$ pF Max	τ $I_F = 50mA$ ns Typ	L_S $f = 3.0\ GHz^*$ $f = 2.50MHz$ nH Typ	C_c $f = 1.0MHz$ $f_T = 1.0MHz^*$ pF Typ	θ_{JC} °C/W Max
Alpha-numerical Listing	First type number on data sheet where the part number is located.	Reverse Breakdown Voltage	Series Resistance	Total Device Capacitance	Minority Carrier Lifetime	Series Inductance	Case Capacitance	Thermal Resistance, Junction to Case

PIN SWITCHING DIODES and MICRO-I PIN SWITCHING DIODES INDEX

TYPE	REFERENCE	$V_{(BR)R}$ $I_R = 10\mu Adc$ Volts Min	R_S $I_F = {}^*10mA$ $I_F = 100mA^{(1)}$ $f = 1.0GHz^{(1)}$ $I_F = 150mA^{(2)}$ $f = 3.0GHz^{(2)}$ ohm Max	C_T $V_R = 20V^{*(3)}$ $V_R = 50V^{(3)}$ $f = 1.0MHz^{(3)}$ $V_R = 250V^{(4)}$ $f = 1.0MHz^{(4)}$ pF Max	τ $I_F = 50mA$ ns Typ	L_S $f = 3.0\ GHz^*$ $f = 2.50MHz$ nH Typ	C_c $f = 1.0MHz$ $f_T = 1.0MHz^*$ pF Typ	θ_{JC} °C/W Max
★MPI-3401	MPI-3401	35	0.7*	1.0*		3.0	0.15*	
MPN3201	MPN3201	150	1.0(1)	0.44(3)	150	0.85	0.18	25
MPN3202	MPN3201	200	1.0(2)	0.40(3)	150	0.85	0.18	25
MPN3208	MPN3208	800	0.4(2)	4.0(4)		0.55*	1.1*	4.0
MPN3209	MPN3208	900	0.4(2)	4.0(4)		0.55*	1.1*	4.0
MPN3401	MPN3401	35	0.7*	1.0*		3.0	0.1	
MPN3402	MPN3401	35	0.6*	2.0*		3.0	0.1	

★MICRO-I

TABLE 17 - SWITCHING DIODES INDEX

The following table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered switching diodes.

KEY

Type	Ref.	$V_{(BR)}$ Volts Min	@ $I_{(BR)}$ μA	V_F Volts Min	V_F Volts Max	@ I_F mA	I_R μA Max	@ V_R Volts	C_c $V_R = 0$ pF	t_{rr} ns *Typ Max
Alpha-numerical Listing										

First type number on data sheet where the part number is located

Breakdown Voltage

Forward Voltage

Reverse Current

Capacitance

Reverse Recovery Time

SWITCHING DIODES INDEX

Type	Ref.	$V_{(BR)}$ Volts Min	@ $I_{(BR)}$ μA	V_F Volts Min	V_F Volts Max	@ I_F mA	I_R μA Max	@ V_R Volts	C_c $V_R = 0$ pF	t_{rr} ns *Typ Max
MMD70	MMD70	50	100	0.75	1.2	100	0.1	30	2.5	15
MMD6050	MMD6050	70	100	0.55	0.7	100	0.1	50	2.0	5.0
MMD6100	MMD6050	70	100	0.55	0.7	100	0.1	50	2.0	5.0
MMD6150	MMD6050	70	100	0.55	0.7	100	0.1	50	2.0	5.0
MMD7000	MMD6050	70	100	0.55	0.7	100	0.1	50	2.0	5.0
MMD7001	MMD7001	40	10		1.05	300	0.1	30	3.5	3.2*

TABLE 18 - OPTOELECTRONIC DEVICES INDEX

The following table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered optoelectronic photo detectors and transistors.

KEY

					MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS			
TYPE	MATERIAL	POLARITY	REFERENCE	USE	P_D @ 25°C Watts	Ref Point	T_J °C	V_{CB} Volts	V_{CE} Volts	Subscript	S_{RCEO} mA/mW/cm2 µ/mW/cm2**	I_{CEO} nA	$t_r + t_f$ µs	I_L µA* mA
Alpha-numerical Listing	S – Silicon	N – NPN	First type number on data sheet where the part number is located	P_D – Photo Detector RD – Radiation Detector	Power Dissipation at 25°C	Ref. Point: A – Ambient	Maximum Operating Junction Temperature	Maximum Collector-Base Voltage	Maximum Collector-Emitter Voltage (Subscript Identifies Condition)		Collector-Emitter Radiation Sensitivity	Collector Dark Current	t_r – Photo Current Rise Time t_f – Photo Current Fall Time	Collector Light Current

OPTOELECTRONIC DEVICES INDEX

					MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS			
TYPE	MATERIAL	POLARITY	REFERENCE	USE	P_D @ 25°C Watts	Ref Point	T_J °C	V_{CB} Volts	V_{CE} Volts	Subscript	S_{RCEO} mA/mW/cm2 µ/mW/cm2**	I_{CEO} nA	$t_r + t_f$ µs	I_L µA* mA
MRD14B	S	N	2N5777	RD	0.2	A	100	18	12	0	1.0	100	400	2.0
MRD150	S	N	MRD150	RD	0.05	A	85	80	40	0	0.04	100	6.5	0.2
MRD300	S	N	MRD300	RD	0.05	A	200		50	0		25	6.5	4.0
MRD310	S	N	MRD300	RD	0.05	A	200		50	0		25	6.5	1.0
MRD450	S	N	MRD450	RD	0.05	A	85		40	0	0.2	100	6.5	1.0
MRD500	S	N	MRD500	RD	0.05	A	200			0	1.2**	2.0	1.0*	6.0*
MRD510	S		MRD500	RD	0.25	A	200				0.3**	2.0	1.0*	1.5*
MRD601	S	N	MRD601	PD	0.1	A	125		50	0	0.025	25	4.8	0.5
MRD602	S		MRD601	PD	0.1	A	125		50		0.1	25	4.8	2.0
MRD603	S		MRD601	PD	0.1	A	125		50		0.2	25	4.8	4.0
MRD604	S	N	MRD601	PD	0.05	A	125		50	0	0.35	25	4.8	7.0
MRD810	S	N	MRD810	RD	0.05	A	125		35	0	0.2	50	11	1.0
MRD3050	S	N	MRD3050	RD	0.05	A	200	40	30	0	0.02	100	5.5	0.1
MRD3051	S	N	MRD3050	RD	0.05	A	200	40	30	0	0.04	100	5.5	0.2
MRD3052	S	N	MRD3050	RD	0.05	A	200	40	30	0	0.02	100	5.5	0.1
MRD3053	S	N	MRD3050	RD	0.25	A	125	40	30	0	0.05	100	5.5	0.25
MRD3054	S	N	MRD3050	RD	0.4	A	200	40	30	0	0.125	100	5.5	0.625
MRD3055	S	N	MRD3050	RD	0.4	A	200	40	30	0	0.3	100	5.5	1.5
MRD3056	S	N	MRD3050	RD	0.4	A	200	40	30	0	0.4	100	5.5	2.0

TABLE 19 - THYRISTOR INDEX

The following tables contain an alpha-numerical listing and short-form specifications for Motorola in-house non-registered thyristors.

KEY

TYPE	REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
Alpha-numerical Listing	First type number on data sheet where the part number is located	On-State (RMS) Current	Peak Forward Blocking Voltage Peak Reverse Blocking Voltage	Maximum Junction Temperature, Maximum Case Temperature	Gate Trigger Current	Gate Trigger Voltage

TYPE		REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
MAC5-1		MAC5	10	25	100	50	2.5
MAC5-2		MAC5	10	50	100	50	2.5
MAC5-3		MAC5	10	100	100	50	2.5
MAC5-4		MAC5	10	200	100	50	2.5
MAC5-5		MAC5	10	300	100	50	2.5
MAC5-6		MAC5	10	400	100	50	2.5
MAC5-7		MAC5	10	500	100	50	2.5
MAC5-8		MAC5	10	600	100	50	2.5
MAC6-1		MAC5	10	25	100	50	2.5
MAC6-2		MAC5	10	50	100	50	2.5
MAC6-3		MAC5	10	100	100	50	2.5
MAC6-4		MAC5	10	200	100	50	2.5
MAC6-5		MAC5	10	300	100	50	2.5
MAC6-6		MAC5	10	400	100	50	2.5
MAC6-7		MAC5	10	500	100	50	2.5
MAC6-8		MAC5	10	600	100	50	2.5
MAC10-1		MAC10-1	10	25	100	50	2.0
MAC10-2		MAC10-1	10	50	100	50	2.0
MAC10-3		MAC10-1	10	100	100	50	2.0
MAC10-4		MAC10-1	10	200	100	50	2.0
MAC10-5		MAC10-1	10	300	100	50	2.0
MAC10-6		MAC10-1	10	400	100	50	2.0
MAC10-7		MAC10-1	10	500	100	50	2.0
MAC10-8		MAC10-1	10	600	100	50	2.0
MAC11-1		MAC10-1	10	25	100	50	2.0
MAC11-2		MAC10-1	10	50	100	50	2.0
MAC11-3		MAC10-1	10	100	100	50	2.0
MAC11-4		MAC10-1	10	200	100	50	2.0
MAC11-5		MAC10-1	10	300	100	50	2.0
MAC11-6		MAC10-1	10	400	100	50	2.0
MAC11-7		MAC10-1	10	500	100	50	2.0
MAC11-8		MAC10-1	10	600	100	50	2.0
MAC35-1		2N6157	25	25	125	60	2.0
MAC35-2		2N6157	25	50	125	60	2.0
MAC35-3		2N6157	25	100	125	60	2.0
MAC35-4		2N6157	25	200	125	60	2.0
MAC35-5		2N6157	25	300	125	60	2.0
MAC35-6		2N6157	25	400	125	60	2.0
MAC35-7		2N6157	25	600	125	60	2.0
MAC36-1		2N6157	25	25	125	60	2.0
MAC36-2		2N6157	25	50	125	60	2.0
MAC36-3		2N6157	25	100	125	60	2.0
MAC36-4		2N6157	25	200	125	60	2.0
MAC36-5		2N6157	25	300	125	60	2.0
MAC36-6		2N6157	25	400	125	60	2.0
MAC36-7		2N6157	25	600	125	60	2.0
MAC37-1		MAC37-1	25	25	110	75	3.0
MAC37-2		MAC37-1	25	50	110	75	3.0
MAC37-3		MAC37-1	25	100	110	75	3.0
MAC37-4		MAC37-1	25	200	110	75	3.0
MAC37-5		MAC37-1	25	300	110	75	3.0
MAC37-6		MAC37-1	25	400	110	75	3.0
MAC37-7		MAC37-1	25	500	110	75	3.0
MAC38-1		MAC37-1	25	25	110	75	3.0
MAC38-2		MAC37-1	25	50	110	75	3.0
MAC38-3		MAC37-1	25	100	110	75	3.0
MAC38-4		MAC37-1	25	200	110	75	3.0
MAC38-5		MAC37-1	25	300	110	75	3.0
MAC38-6		MAC37-1	25	400	110	75	3.0
MAC38-7		MAC37-1	25	500	110	75	3.0
MAC40688		2N5441	40	200	110	70	2.0
MAC40689		2N5441	40	400	110	70	2.0
MAC40690		2N5441	40	600	110	70	2.0
MCR32-05		MCR32	7.0	50	135	20	1.5
MCR32-20		MCR32	7.0	200	135	20	1.5
MCR32-30		MCR32	7.0	300	135	20	1.5
MCR32-40		MCR32	7.0	400	135	20	1.5
MCR32-50		MCR32	7.0	500	135	20	1.5
MCR32-60		MCR32	7.0	600	135	20	1.5
MCR35-05		MCR35	35	50	100	40	1.6

TYPE		REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
MCR35-10		MCR35	35	100	100	40	1.6
MCR35-20		MCR35	35	200	100	40	1.6
MCR35-40		MCR35	35	400	100	40	1.6
MCR35-60		MCR35	35	600	100	40	1.6
MCR35-80		MCR35	35	800	100	40	1.6
MCR36-05		MCR35	35	50	100	40	1.6
MCR36-10		MCR35	35	100	100	40	1.6
MCR36-20		MCR35	35	200	100	40	1.6
MCR36-40		MCR35	35	400	100	40	1.6
MCR36-60		MCR35	35	600	100	40	1.6
MCR36-80		MCR35	35	800	100	40	1.6
MCR39-05		MCR39	7.0	50	135	15	1.25
MCR39-20		MCR39	7.0	200	135	15	1.25
MCR39-30		MCR39	7.0	300	135	15	1.25
MCR39-40		MCR39	7.0	400	135	15	1.25
MCR39-50		MCR39	7.0	500	135	15	1.25
MCR39-60		MCR39	7.0	600	135	15	1.25
MCR051		MCR051	0.25	15	125	0.2	0.8
MCR052		MCR051	0.25	30	125	0.2	0.8
MCR053		MCR051	0.25	60	125	0.2	0.8
MCR054		MCR051	0.25	100	125	0.2	0.8
MCR101		MCR101	0.8	15	85	0.1	1.7
MCR102		MCR101	0.8	30	85	0.1	1.7
MCR103		MCR101	0.8	60	85	0.1	1.7
MCR104		MCR101	0.8	100	85	0.1	1.7
MCR106-1		MCR106-1	4.0	30	110	0.5	1.0
MCR106-2		MCR106-1	4.0	60	110	0.5	1.0
MCR106-3		MCR106-1	4.0	100	110	0.5	1.0
MCR106-4		MCR106-1	4.0	200	110	0.5	1.0
MCR115		MCR115	0.8	150	110	0.2	0.8
MCR120		MCR120	0.8	200	110	0.2	0.8
MCR154-10		MCR154	110	100	125	150	3.0
MCR154-20		MCR154	110	200	125	150	3.0
MCR154-30		MCR154	110	300	125	150	3.0
MCR154-40		MCR154	110	400	125	150	3.0
MCR154-50		MCR154	110	500	125	150	3.0
MCR154-60		MCR154	110	600	125	150	3.0
MCR155-10		MCR154	110	100	125	150	3.0
MCR155-20		MCR154	110	200	125	150	3.0
MCR155-30		MCR154	110	300	125	150	3.0
MCR155-40		MCR154	110	400	125	150	3.0
MCR155-50		MCR154	110	500	125	150	3.0
MCR155-60		MCR154	110	600	125	150	3.0
MCR156-10		MCR154	110	100	125	150	3.0
MCR156-20		MCR154	110	200	125	150	3.0
MCR156-30		MCR154	110	300	125	150	3.0
MCR156-40		MCR154	110	400	125	150	3.0
MCR156-50		MCR154	110	500	125	150	3.0
MCR156-60		MCR154	110	600	125	150	3.0
MCR157-10		MCR154	110	100	125	150	3.0
MCR157-20		MCR154	110	200	125	150	3.0
MCR157-30		MCR154	110	300	125	150	3.0
MCR157-40		MCR154	110	400	125	150	3.0
MCR157-50		MCR154	110	500	125	150	3.0
MCR157-60		MCR154	110	600	125	150	3.0
MCR158-50		MCR158	110	500	125	150	3.0
MCR158-60		MCR158	110	600	125	150	3.0
MCR158-70		MCR158	110	700	125	150	3.0
MCR158-80		MCR158	110	800	125	150	3.0
MCR158-90		MCR158	110	900	125	150	3.0
MCR158-100		MCR158	110	1000	125	150	3.0
MCR158-110		MCR158	110	1100	125	150	3.0
MCR158-120		MCR158	110	1200	125	150	3.0
MCR159-50		MCR158	110	500	125	150	3.0
MCR159-60		MCR158	110	600	125	150	3.0
MCR159-70		MCR158	110	700	125	150	3.0
MCR159-80		MCR158	110	800	125	150	3.0
MCR159-90		MCR158	110	900	125	150	3.0
MCR159-100		MCR158	110	1000	125	150	3.0
MCR159-110		MCR158	110	1100	125	150	3.0

TYPE		REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
MCR159-120		MCR158	110	1200	125	150	3.0
MCR201		MCR201	0.5	15	110	0.2	0.8
MCR202		MCR201	0.5	30	110	0.2	0.8
MCR203		MCR201	0.5	60	110	0.2	0.8
MCR204		MCR201	0.5	100	110	0.2	0.8
MCR205		MCR201	0.5	150	110	0.2	0.8
MCR206		MCR201	0.5	200	110	0.2	0.8
MCR235-10		MCR235	235	100	125	150	3.0
MCR235-20		MCR235	235	200	125	150	3.0
MCR235-30		MCR235	235	300	125	150	3.0
MCR235-40		MCR235	235	400	125	150	3.0
MCR235-50		MCR235	235	500	125	150	3.0
MCR235-60		MCR235	235	600	125	150	3.0
MCR235-70		MCR235	235	700	125	150	3.0
MCR235-80		MCR235	235	800	125	150	3.0
MCR235-90		MCR235	235	900	125	150	3.0
MCR235-100		MCR235	235	1000	125	150	3.0
MCR235-110		MCR235	235	1100	125	150	3.0
MCR235-120		MCR235	235	1200	125	150	3.0
MCR235-130		MCR235	235	1300	125	150	3.0
MCR235-140		MCR235	235	1400	125	150	3.0
MCR235-150		MCR235	235	1500	125	150	3.0
MCR235A-10		MCR235A	235	100	125	150	3.0
MCR235A-20		MCR235A	235	200	125	150	3.0
MCR235A-30		MCR235A	235	300	125	150	3.0
MCR235A-40		MCR235A	235	400	125	150	3.0
MCR235A-50		MCR235A	235	500	125	150	3.0
MCR235A-60		MCR235A	235	600	125	150	3.0
MCR235B-10		MCR235A	235	100	125	150	3.0
MCR235B-20		MCR235A	235	200	125	150	3.0
MCR235B-30		MCR235A	235	300	125	150	3.0
MCR235B-40		MCR235A	235	400	125	150	3.0
MCR235B-50		MCR235A	235	500	125	150	3.0
MCR235B-60		MCR235A	235	600	125	150	3.0
MCR235B-70		MCR235A	235	700	125	150	3.0
MCR235B-80		MCR235A	235	800	125	150	3.0
MCR235C-10		MCR235A	235	100	125	150	3.0
MCR235C-20		MCR235A	235	200	125	150	3.0
MCR235C-30		MCR235A	235	300	125	150	3.0
MCR235C-40		MCR235A	235	400	125	150	3.0
MCR235C-50		MCR235A	235	500	125	150	3.0
MCR235C-60		MCR235A	235	600	125	150	3.0
MCR235C-70		MCR235A	235	700	125	150	3.0
MCR235C-80		MCR235A	235	800	125	150	3.0
MCR235C-90		MCR235A	235	900	125	150	3.0
MCR235C-100		MCR235A	235	1000	125	150	3.0
MCR320-1		MCR320	7.0	25	100	20	1.5
MCR320-2		MCR320	7.0	50	100	20	1.5
MCR320-3		MCR320	7.0	100	100	20	1.5
MCR320-4		MCR320	7.0	200	100	20	1.5
MCR320-5		MCR320	7.0	300	100	20	1.5
MCR320-6		MCR320	7.0	400	100	20	1.5
MCR320-7		MCR320	7.0	500	100	20	1.5
MCR320-8		MCR320	7.0	600	100	20	1.5
MCR380-10		MCR380	380	100	125	150	3.0
MCR380-20		MCR380	380	200	125	150	3.0
MCR380-30		MCR380	380	300	125	150	3.0
MCR380-40		MCR380	380	400	125	150	3.0
MCR380-50		MCR380	380	500	125	150	3.0
MCR380-60		MCR380	380	600	125	150	3.0
MCR380-70		MCR380	380	700	125	150	3.0
MCR380-80		MCR380	380	800	125	150	3.0
MCR380-90		MCR380	380	900	125	150	3.0
MCR380-100		MCR380	380	1000	125	150	3.0
MCR380-110		MCR380	380	1100	125	150	3.0
MCR380-120		MCR380	380	1200	125	150	3.0
MCR380-130		MCR380	380	1300	125	150	3.0
MCR380-140		MCR380	380	1400	125	150	3.0
MCR380-150		MCR380	380	1500	125	150	3.0
MCR380B-10		MCR380B	380	100	125	150	3.0

THYRISTOR INDEX

TYPE		REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
MCR380B-20		MCR380B	380	200	125	150	3.0
MCR380B-30		MCR380B	380	300	125	150	3.0
MCR380B-40		MCR380B	380	400	125	150	3.0
MCR380B-50		MCR380B	380	500	125	150	3.0
MCR380B-60		MCR380B	380	600	125	150	3.0
MCR380B-70		MCR380B	380	700	125	150	3.0
MCR380B-80		MCR380B	380	800	125	150	3.0
MCR380C-10		MCR380B	380	100	125	150	3.0
MCR380C-20		MCR380B	380	200	125	150	3.0
MCR380C-30		MCR380B	380	300	125	150	3.0
MCR380C-40		MCR380B	380	400	125	150	3.0
MCR380C-50		MCR380B	380	500	125	150	3.0
MCR380C-60		MCR380B	380	600	125	150	3.0
MCR380C-70		MCR380B	380	700	125	150	3.0
MCR380C-80		MCR380B	380	800	125	150	3.0
MCR380C-90		MCR380B	380	900	125	150	3.0
MCR380C-100		MCR380B	380	1000	125	150	3.0
MCR380D-10		MCR380B	380	100	125	150	3.0
MCR380D-20		MCR380B	380	200	125	150	3.0
MCR380D-30		MCR380B	380	300	125	150	3.0
MCR380D-40		MCR380B	380	400	125	150	3.0
MCR380D-50		MCR380B	380	500	125	150	3.0
MCR380D-60		MCR380B	380	600	125	150	3.0
MCR380D-70		MCR380B	380	700	125	150	3.0
MCR380D-80		MCR380B	380	800	125	150	3.0
MCR380D-90		MCR380B	380	900	125	150	3.0
MCR380D-100		MCR380B	380	1000	125	150	3.0
MCR380D-110		MCR380B	380	1100	125	150	3.0
MCR380D-120		MCR380B	380	1200	125	150	3.0
MCR406-1		MCR406	4.0	30	110	0.2	0.8
MCR406-2		MCR406	4.0	60	110	0.2	0.8
MCR406-3		MCR406	4.0	100	110	0.2	0.8
MCR406-4		MCR406	4.0	200	110	0.2	0.8
MCR407-1		MCR407	4.0	30	110	0.5	1.0
MCR407-2		MCR407	4.0	60	110	0.5	1.0
MCR407-3		MCR407	4.0	100	110	0.5	1.0
MCR407-4		MCR407	4.0	200	110	0.5	1.0
MCR470-10		MCR470	470	100	125	150	3.0
MCR470-20		MCR470	470	200	125	150	3.0
MCR470-30		MCR470	470	300	125	150	3.0
MCR470-40		MCR470	470	400	125	150	3.0
MCR470-50		MCR470	470	500	125	150	3.0
MCR470-60		MCR470	470	600	125	150	3.0
MCR470-70		MCR470	470	700	125	150	3.0
MCR470-80		MCR470	470	800	125	150	3.0
MCR470-90		MCR470	470	900	125	150	3.0
MCR470-100		MCR470	470	1000	125	150	3.0
MCR470-110		MCR470	470	1100	125	150	3.0
MCR470-120		MCR470	470	1200	125	150	3.0
MCR470-130		MCR470	470	1300	125	150	3.0
MCR470-140		MCR470	470	1400	125	150	3.0
MCR470-150		MCR470	470	1500	125	150	3.0
MCR470C-10		MCR470C	470	100	125	150	3.0
MCR470C-20		MCR470C	470	200	125	150	3.0
MCR470C-30		MCR470C	470	300	125	150	3.0
MCR470C-40		MCR470C	470	400	125	150	3.0
MCR470C-50		MCR470C	470	500	125	150	3.0
MCR470C-60		MCR470C	470	600	125	150	3.0
MCR470C-70		MCR470C	470	700	125	150	3.0
MCR470C-80		MCR470C	470	800	125	150	3.0
MCR470D-10		MCR470C	470	100	125	150	3.0
MCR470D-20		MCR470C	470	200	125	150	3.0
MCR470D-30		MCR470C	470	300	125	150	3.0
MCR470D-40		MCR470C	470	400	125	150	3.0
MCR470D-50		MCR470C	470	500	125	150	3.0
MCR470D-60		MCR470C	470	600	125	150	3.0
MCR470D-70		MCR470C	470	700	125	150	3.0
MCR470D-80		MCR470C	470	800	125	150	3.0
MCR470D-90		MCR470C	470	900	125	150	3.0
MCR470D-100		MCR470C	470	1000	125	150	3.0

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TYPE		REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
MCR470E-10		MCR470C	470	100	125	150	3.0
MCR470E-20		MCR470C	470	200	125	150	3.0
MCR470E-30		MCR470C	470	300	125	150	3.0
MCR470E-40		MCR470C	470	400	125	150	3.0
MCR470E-50		MCR470C	470	500	125	150	3.0
MCR470E-60		MCR470C	470	600	125	150	3.0
MCR470E-70		MCR470C	470	700	125	150	3.0
MCR470E-80		MCR470C	470	800	125	150	3.0
MCR470E-90		MCR470C	470	900	125	150	3.0
MCR470E-100		MCR470C	470	1000	125	150	3.0
MCR470E-110		MCR470C	470	1100	125	150	3.0
MCR470E-120		MCR470C	470	1200	125	150	3.0
MCR649-1		MCR649	20	25	100	80	3.5
MCR649-2		MCR649	20	50	100	80	3.5
MCR649-3		MCR649	20	100	100	80	3.5
MCR649-4		MCR649	20	200	100	80	3.5
MCR649-5		MCR649	20	300	100	80	3.5
MCR649-6		MCR649	20	400	100	80	3.5
MCR649-7		MCR649	20	500	100	80	3.5
MCR729-5		MCR729	2.0	50	105	50	1.5
MCR729-6		MCR729	2.0	50	105	50	1.5
MCR729-7		MCR729	2.0	50	105	50	1.5
MCR729-8		MCR729	2.0	50	105	50	1.5
MCR729-9		MCR729	2.0	50	105	50	1.5
MCR729-10		MCR729	2.0	50	105	50	1.5
MCR1336-5		MCR1336	2.0	300	105	40	1.25
MCR1336-6		MCR1336	2.0	400	105	40	1.25
MCR1336-7		MCR1336	2.0	500	105	40	1.25
MCR1336-8		MCR1336	2.0	600	105	40	1.25
MCR1336-9		MCR1336	2.0	700	105	40	1.25
MCR1336-10		MCR1336	2.0	800	105	40	1.25
MCR1718-5		MCR1718	25	300	125	50	1.5
MCR1718-6		MCR1718	25	400	125	50	1.5
MCR1718-7		MCR1718	25	500	125	50	1.5
MCR1718-8		MCR1718	25	600	125	50	1.5
MCR1906-1		MCR1906	1.6	25	100	1.0	1.0
MCR1906-2		MCR1906	1.6	50	100	1.0	1.0
MCR1906-3		MCR1906	1.6	100	100	1.0	1.0
MCR1906-4		MCR1906	1.6	200	100	1.0	1.0
MCR1907-1		MCR1907	25	35	125	30	1.5
MCR1907-2		MCR1907	25	75	125	30	1.5
MCR1907-3		MCR1907	25	150	125	30	1.5
MCR1907-4		MCR1907	25	300	125	30	1.5
MCR1907-5		MCR1907	25	400	125	30	1.5
MCR1907-6		MCR1907	25	500	125	30	1.5
MCR2315-1		MCR2315	8.0	25	100	40	1.5
MCR2315-2		MCR2315	8.0	50	100	40	1.5
MCR2315-3		MCR2315	8.0	100	100	40	1.5
MCR2315-4		MCR2315	8.0	200	100	40	1.5
MCR2315-5		MCR2315	8.0	300	100	40	1.5
MCR2315-6		MCR2315	8.0	400	100	40	1.5
MCR2614L-1		MCR2315	8.0	25	100	40	1.5
MCR2614L-2		MCR2315	8.0	50	100	40	1.5
MCR2614L-3		MCR2315	8.0	100	100	40	1.5
MCR2614L-4		MCR2315	8.0	200	100	40	1.5
MCR2614L-5		MCR2315	8.0	300	100	40	1.5
MCR2614L-6		MCR2315	8.0	400	100	40	1.5
MCR3818-1		MCR3818-1	20	25	100	40	1.5
MCR3818-2		MCR3818-1	20	50	100	40	1.5
MCR3818-3		MCR3818-1	20	100	100	40	1.5
MCR3818-4		MCR3818-1	20	200	100	40	1.5
MCR3818-5		MCR3818-1	20	300	100	40	1.5
MCR3818-6		MCR3818-1	20	400	100	40	1.5
MCR3818-7		MCR3818-1	20	500	100	40	1.5
MCR3818-8		MCR3818-1	20	600	100	40	1.5
MCR3918-1		MCR3818-1	20	25	100	40	1.5
MCR3918-2		MCR3818-1	20	50	100	40	1.5
MCR3918-3		MCR3818-1	20	100	100	40	1.5
MCR3918-4		MCR3818-1	20	200	100	40	1.5
MCR3918-5		MCR3818-1	20	300	100	40	1.5

TYPE		REFERENCE	$I_{T(RMS)}$ Amp	V_{DRM} / V_{RRM} Volts	T_J °C	I_{GT} mA	V_{GT} Volts
MCR3918-6		MCR3818-1	20	400	100	40	1.5
MCR3918-7		MCR3818-1	20	500	100	40	1.5
MCR3918-8		MCR3818-1	20	600	100	40	1.5
MCR3835-1		MCR3835-1	35	25	100	40	1.5
MCR3835-2		MCR3835-1	35	50	100	40	1.5
MCR3835-3		MCR3835-1	35	100	100	40	1.5
MCR3835-4		MCR3835-1	35	200	100	40	1.5
MCR3835-5		MCR3835-1	35	300	100	40	1.5
MCR3835-6		MCR3835-1	35	400	100	40	1.5
MCR3835-7		MCR3835-1	35	500	100	40	1.5
MCR3835-8		MCR3835-1	35	600	100	40	1.5
MCR3935-1		MCR3835-1	35	25	100	40	1.5
MCR3935-2		MCR3835-1	35	50	100	40	1.5
MCR3935-3		MCR3835-1	35	100	100	40	1.5
MCR3935-4		MCR3835-1	35	200	100	40	1.5
MCR3935-5		MCR3835-1	35	300	100	40	1.5
MCR3935-6		MCR3835-1	35	400	100	40	1.5
MCR3935-7		MCR3835-1	35	500	100	40	1.5
MCR3935-8		MCR3835-1	35	600	100	40	1.5
MLS101		MLS101	250	15	40	100*	0.8
MLS102		MLS101	250	30	40	100*	0.8
MLS103		MLS101	250	60	40	100*	0.8
MLS104		MLS101	250	100	40	100*	0.8
MLS105		MLS101	250	200	40	100*	0.8
MLS201		MLS101	400	15	40	100*	0.8
MLS202		MLS101	400	30	40	100*	0.8
MLS203		MLS101	400	60	40	100*	0.8
MLS204		MLS101	400	100	40	100*	0.8
MLS205		MLS101	400	200	40	100*	0.8

TABLE 20 - BIDIRECTIONAL SWITCH INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered bidirectional switch.

KEY

TYPE	REFERENCE	V_S		$\lvert V_{S1} - V_{S2} \rvert$	I_S	I_H	V_F
		Min	Max	Max	Max	Max	Max
Alpha-numerical Listing	First type number on data sheet where the part number is located	Switching Voltage		Switching Voltage Differential	Switching Current	Holding Current	Forward On-State Voltage

BIDIRECTIONAL SWITCH INDEX

TYPE	REFERENCE	V_S		$\lvert V_{S1} - V_{S2} \rvert$	I_S	I_H	V_F
		Min	Max	Max	Max	Max	Max
MBS100	MBS100	3.0	5.0	0.35	400	1.0	2.0
MBS4991	MBS4991	6.0	10	0.5	350	1.5	1.7
MBS4992	MBS4991	7.5	9.0	0.2	120	0.5	1.7

TABLE 21 - BILATERAL TRIGGER DIACS INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered bilateral trigger diacs.

KEY

TYPE	REFERENCE	$V_{(BR)}$ Volts Nom	ΔV Volts Min	$I_{(BR)}$ µA Max	I_{Pulse} @ 30µs, 120 Hz Amp Max
Alpha-numerical Listing	First type number on data sheet where the part number is located	Breakdown Voltage (both directions)	Switchback (Delta) Voltage (both directions)	Breakdown Current (both directions)	Peak Pulse Current

BILATERAL TRIGGER DIACS INDEX

TYPE	REFERENCE	$V_{(BR)}$ Volts Nom	ΔV Volts Min	$I_{(BR)}$ µA Max	I_{Pulse} @ 30µs, 120 Hz Amp Max
MPT20	1N5758	20	5.0	100	2.0
MPT28	1N5758	28	7.0	50	2.0
MPT32	1N5758	32	7.0	50	2.0

TABLE 22 - UNIDIRECTIONAL SWITCH INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered unidirectional switches.

KEY

TYPE	REFERENCE	V_S Volts Min Max	I_S µA Max	I_H mA	V_F I_F = 150 mA	I_B @ 50V µA	P_D mW	V_R Volts Max	V_O Volts Min	I_F (rep) T_A = 100°C t_p = 10µs 1.0% duty cycle Amp
Alpha-Numerical listing	First type number on data sheet where the part number is located	Switching Voltage	Switching Current	Holding Current	Forward On-State Voltage	Forward Blocking Current	Power Dissipation	Reverse Voltage	Peak Output Voltage	Peak Recurrent Forward Current

UNIDIRECTIONAL SWITCH INDEX

TYPE	REFERENCE	V_S Volts Min	V_S Volts Max	I_S µA Max	I_H mA	V_F I_F = 150 mA	I_B @ 5.0V µA	P_D mW	V_R Volts Max	V_O Volts Min	I_F (rep) T_A = 100°C t_p = 10µs 1.0% duty cycle Amp
MUS4987	MUS4987	6.0	10	500	1.5	1.5	1.0	300	30	3.5	1.0
MUS4988	MUS4987	7.5	9.0	150	0.5	1.5	0.1	350	30	3.5	1.0

TABLE 23 - FIELD-EFFECT TRANSISTORS INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered field-effect transistors.

KEY

<table>
<tr><th rowspan="3">TYPE</th><th rowspan="3">POLARITY</th><th rowspan="3">CONST.</th><th colspan="2">I_{DSS}</th><th rowspan="3">I_{GSS}
I_{DGO}*
nA</th><th colspan="2">Breakdown Voltage</th><th colspan="2">y_{fs}</th><th rowspan="3">C_{iss}
pF</th><th colspan="3">NF @ f</th><th rowspan="3">NOTE
D – Dual
MP – Matched Pair</th></tr>
<tr><th>Min
mA</th><th>Max
mA</th><th rowspan="2">$V_{(BR)}$
Volts</th><th rowspan="2">Sub-script</th><th>Min
µmhos</th><th>Max
µmhos</th><th rowspan="2">dB
µV*
$\sqrt{Hz}$</th><th rowspan="2"></th><th rowspan="2">Units</th></tr>
<tr><th colspan="2">* nA</th><th colspan="2">*mmhos</th></tr>
<tr><td>Alpha-numerical Listing</td><td>N – n-channel
P – p-channel</td><td>J – Junction FET
M – MOS FET</td><td colspan="2">Minimum and Maximum Drain Current with gate connected to source</td><td>Maximum Gate Current (Leakage) with drain connected to source
*Maximum leakage from drain to gate with source open</td><td colspan="2">Minimum Breakdown Voltage (Subscript defines conditions)
GS – Gate to source, drain connection not specified
GSS – Gate to source, drain connected to source
GD – Gate to drain, source connection not specified
GDS – Gate to drain, source connected to drain
DGO – Drain to gate, source open
DGS – Drain to gate, source connected to drain
DS – Drain to source, gate connection not specified
DSX – Drain to source, gate biased to cutoff or beyond</td><td colspan="2">Minimum and Maximum Forward Transadmittance</td><td>Maximum Input Capacitance</td><td colspan="3">Noise Figure in dB or *, µV/$\sqrt{Hz}$ at a specified frequency
frequency units:
H – Hz
K – kHz
M – MHz</td><td></td></tr>
</table>

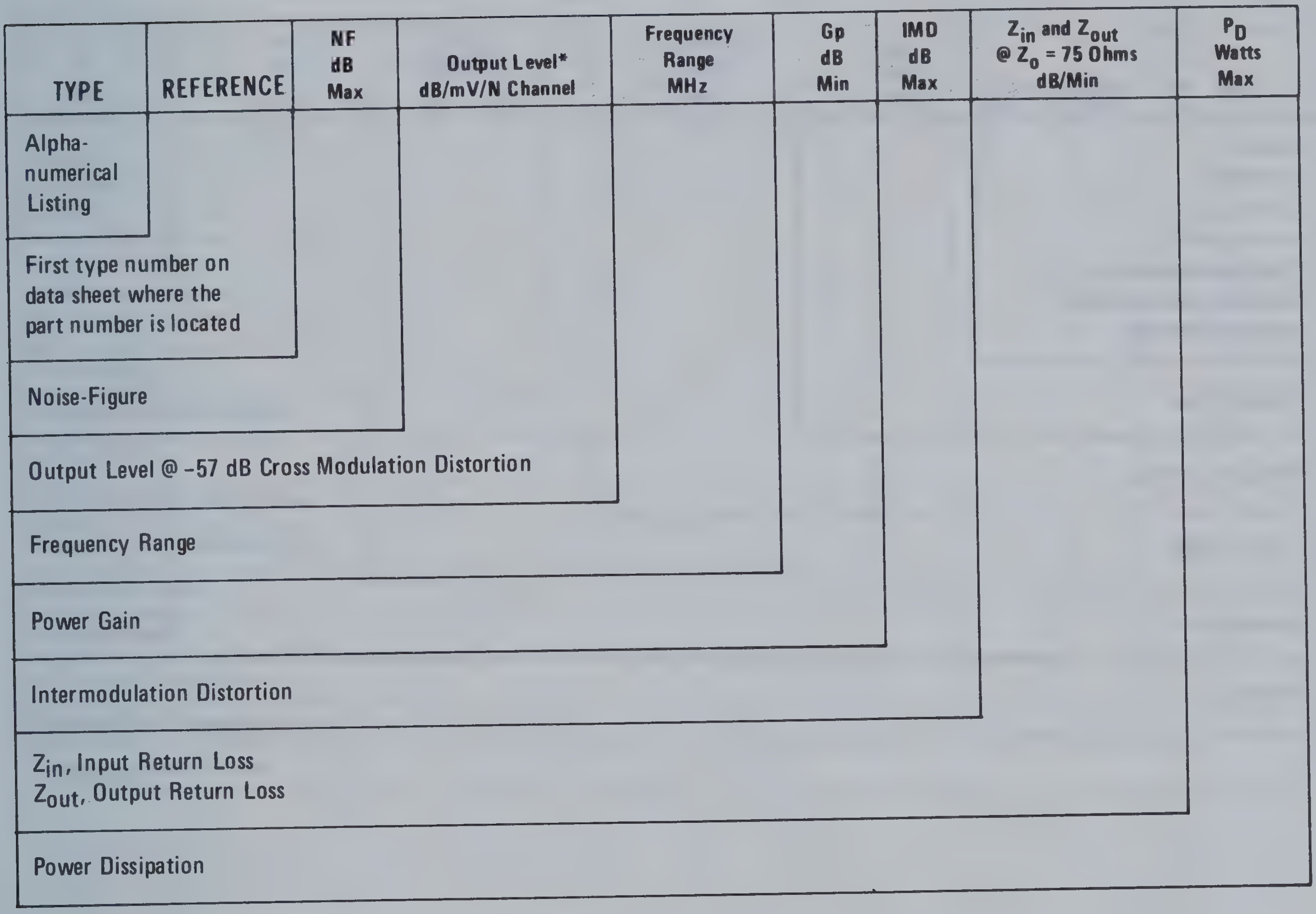
FIELD-EFFECT TRANSISTORS INDEX

TYPE	POLARITY	CONST.		REFERENCE	I_{DSS}		I_{GSS} I_{DGO}*	Breakdown Voltage		y_{fs}		C_{ISS}	NF @ f		NOTE
					Min mA	Max mA	nA	$V_{(BR)}$ Volts	Sub-script	Min µmhos	Max µmhos	pF	dB $\frac{\mu V^*}{\sqrt{Hz}}$	Units	
					*nA					*mmhos					
MFE120	N	M			2.0	18	20	25	DSX	8000	18000	7.0	5.0	150M	
MFE121	N	M			5.0	30	20	25	DSX	10000	20000	6.0	5.0	60M	
MFE122	N	M			2.0	20	20	25	DSX	8000	18000	7.0	5.0	200M	
MFE130	N	M			3.0	30	20	25	DSX	8000	20000	7.0	5.0	105M	Dual
MFE131	N	M			3.0	30	20	25	DSX	8000	20000	7.0	5.0	60M	Dual
MFE132	N	M			3.0	30	20	25	DSX	8000	20000	7.0	5.0	200M	Dual
MFE2000	N	J			4.0	10	-200	-25	GSS	2500	6000	5.0	2.0	100M	
MFE2001	N	J			8.0	20	-200	-25	GSS	4000	8000	5.0	2.0	100M	
MFE2004	N	J			8.0		0.2	30	GSS			16			
MFE2005	N	J			15		0.2	30	GSS			16			
MFE2006	N	J			30		0.2	30	GSS			16			
MFE2007	N	J			8.0		2.0	25	GSS			30			
MFE2008	N	J			20		2.0	25	GSS			30			
MFE2009	N	J			50		2.0	25	GSS			30			
MFE2010	N	J			15		3.0	25	GSS			50			
MFE2011	N	J			40		3.0	25	GSS			50			
MFE2012	N	J			100		3.0	25	GSS			50			
MFE2093	N	J			0.1	0.7	-0.1	-50	GSS	250	500	6.0			
MFE2094	N	J			0.4	1.4	-0.1	-50	GSS	350	700	6.0			
MFE2095	N	J			1.0	3.0	-0.1	-50	GSS	400	800	6.0			
MFE3001	N	J			0.5	6.0	0.01	20	DSX	700	3500	5.0			
MFE3002	N	M				10*	0.1	15	DSS			5.0			
MFE3003	P	M				10*	0.1	-15	DSS						
MFE3004	N	M			2.0	10	0.05	20	DSX	2000		4.5	4.5	200M	
MFE3005	N	M			2.0	10	0.05	20	DSX	2000		4.5	4.5	400M	
MFE3006	N	M			2.0	18	10	25	DSX	8000	18000	6.0	4.0	100M	
MFE3007	N	M			5.0	20	10	25	DSX	10000	18000	5.5	4.0	200M	
MFE3008	N	M			2.0	20	10	25	DSX	8000	18000	6.0			
MFE3020	P	M				10*	0.01	-25	DSS	500		7.0			
MFE3021	P	M				10*	0.01	-25	DSS	500		7.0			
MFE4007	P	J			0.5	1.0	2.0	40	GSS	900	2700	7.0	2.5	100H	
MFE4008	P	J			0.8	1.6	2.0	40	GSS	1000	3000	7.0	2.5	100H	
MFE4009	P	J			1.5	3.0	2.0	40	GSS	1500	3500	7.0	2.5	100H	
MFE4010	P	J			2.5	5.0	2.0	40	GSS	2000	4000	7.0	2.5	100H	
MFE4011	P	J			4.0	8.0	2.0	40	GSS	2200	4500	7.0	2.5	100H	
MFE4012	P	J			7.0	14	2.0	40	GSS	2500	5000	7.0	2.5	100H	
MFE5000	P	M			1.0*	10*	1.0	25	DSS	2000	8000	6.0			Quad
MMF1	N	J			0.5	10	0.05	30	GSS	1500	6500	6.0	2.5	100H	
MMF2	N	J			0.5	10	0.05	30	GSS	1500	6500	6.0	2.5	100H	
MMF3	N	J			0.5	10	0.05	30	GSS	1500	6500	6.0	2.5	100H	
MMF4	N	J			0.5	10	0.05	30	GSS	1500	6500	6.0	2.5	100H	
MMF5	N	J			0.5	10	0.05	30	GSS	1500	6500	6.0	2.5	100H	
MMF6	N	J			0.5	10	0.05	30	GSS	1500	6500	6.0	2.5	100H	
MMT3823	N	J			5.0	20	-1.0	-30	GSS	3000	8000	4.0	2.0	100M	
MPF102	N	J			2.0	20	-2.0	-25	GSS	2000	7500	7.0			
MPF108	N	J			1.5	24	1.0	-25	GSS	2000	7500	6.5	2.5	1.0k	
MPF109	N	J			0.5	24	-1.0	-25	GSS	800	1600	7.0	2.5	1.0k	
MPF111	N	J			0.5	20	100	-20	GSS	500		4.5*			
MPF112	N	J			1.0	25	100	-25	GSS	1000	7500	8.0*			
MPF120	N	M			2.0	7.0	20	25	DSX	8000	18000	7.0	5.0	105M	Dual
MPF121	N	M			5.0	10	20	25	DSX	10000	20000	6.0	5.0	60M	Dual
MPF122	N	M			2.0	9.0	20	25	DSX	8000	18000	7.0	5.0	200M	Dual
MPF130	N	M			3.0	30	20	25	DSX	8000	20000	7.0	5.0	105M	Dual
MPF131	N	M			3.0	30	20	25	DSX	8000	20000	7.0	5.0	60M	Dual
MPF132	N	M			3.0	30	20	25	DSX	8000	20000	7.0	5.0	200M	Dual
MPF161	P	J			0.5	14	10	40	GSS	800	6000	7.0	2.5	1.0k	
MPF256	N	J			3.0(1)	7.0(1)	5.0	25	GSS	6.0*	-	3.0	2.0		
MPF820	S	J			10		5.0	25	GSS	20*typ	15*	4.0			
MPF970	S	J			15	60	1.0	30	GSS			12			
MPF971	S	J			2.0	30	1.0	30	GSS			12			
MPF4391	N	J			60	130	1.0	30	GSS			10			
MPF4392	N	J			25	75	1.0	30	GSS			10			
MPF4393	N	J			5.0	30	1.0	30	GSS			10			

TABLE 24 - WIDEBAND AMPLIFIER MODULES INDEX

The following table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered wideband amplifier modules.

KEY


TYPE
REFERENCE
NF dB Max
Output Level* dB/mV/N Channel
Frequency Range MHz
Gp dB Min
IMD dB Max
Z_{in} and Z_{out} @ Z_0 = 75 Ohms dB/Min
P_D Watts Max
Alpha-numerical Listing
First type number on data sheet where the part number is located
Noise-Figure
Output Level @ –57 dB Cross Modulation Distortion
Frequency Range
Power Gain
Intermodulation Distortion
Z_{in}, Input Return Loss
Z_{out}, Output Return Loss
Power Dissipation

*To NCTA Specification

WIDEBAND AMPLIFIER MODULES INDEX

TYPE	REFERENCE	NF dB Max	Output Level* dB/mV/N Channel	Frequency Range MHz	Gp dB Min	IMD dB Max	Z_{in} and Z_{out} @ Z_0 = 75 Ohms dB/Min	P_D Watts Max
MHW559	MHW559	7.5	47/21	40-300	15	-69	16	5.0
MHW560	MHW560	8.5	44/21	40-300	15	-62	16	5.0
MHW561	MHW561	12	47/21	40-300	15	-69	16	6.0
MHW562	MHW562	10	50/21	40-300	15	-69	16	6.0
MHW563	MHW563	10	51/12	3-120	15	-66	16	4.5

TABLE 25 - UHF POWER MODULES INDEX

The following table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered UHF Power Modules

KEY

TYPE	REFERENCE	P_{out} Watts Min	Frequency Range Min	Z_{in} Z_0 = 50 Ohms Max	Gp dB Min	η % Min
Alpha-numerical Listing						
First type number on data sheet where the part number is located						
Output Power						
Frequency Range						
Input VSWR						
Power Gain						
Efficiency						

UHF POWER MODULES INDEX

TYPE	REFERENCE	P_{out} Watts Min	Frequency Range Min	Z_{in} Z_0 = 50 Ohms Max	Gp dB Min	η % Min
MHW709	MHW709	7.5	400-470	2:1	18.8	35
MHW710	MHW710	13	400-470	2:1	19.4	35

TABLE 26 - PROGRAMMABLE UNIJUNCTION TRANSISTORS (PUT) INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered programmable unijunction transistors.

KEY

Type	Ref.	I_P R_G = 10 kΩ μA Max	R_G = 1.0 MΩ μA Max	I_{GAO} @ 40 V nA Max	I_V R_G = 10 kΩ μA Min	R_G = 1.0MΩ μA Max	V_{GKF} Volts Max	P_F mW	V_O Volts Min	V_F @ Volts	I_F mA	I_T mA Max	I_{TRM} 20 μs *10 μs 1.0% DC Amp Max	T_{stg} °C
Alpha-numerical Listing	First type number on data sheet where the part number is located	Peak Current		Gate to Anode Leakage Current	Valley Current		Gate to Cathode Forward Voltage	Forward Power Dissipation @ 25°C	Peak Output Voltage	Forward Voltage		DC Forward Anode Current	Repetitive Peak Forward Current	Storage Temperature Range

PROGRAMMABLE UNIJUNCTION TRANSISTORS (PUT) INDEX

TYPE	REF.	I_P R_G = 10 kΩ μA Max	R_G = 1.0 MΩ μA Max	I_{GAO} @ 40 V nA Max	I_V R_G = 10 kΩ μA Min	R_G = 1.0MΩ μA Max	V_{GKF} Volts Max	P_F mW	V_O Volts Min	V_F @ Volts	I_F mA	I_T mA Max	I_T(pulse) 20 μs 1.0% DC Amp Max	T_{stg} °C
MPU131	MPU131	5.0	2.0	5.0	70	50	40	375	6.0	1.5	50	200	2.0	-65 to +150
MPU132	MPU131	2.0	0.30	5.0	50	50	40	375	6.0	1.5	50	200	2.0	-65 to +150
MPU133	MPU131	1.0	0.15	5.0	50	25	40	375	6.0	1.5	50	200	2.0	-65 to +150
MPU231	2N6116	5.0	2.0	5.0	70	50	40	250	6.0	1.5	50	200	2.0	-65 to +200
MPU232	2N6116	2.0	0.30	5.0	50	50	40	250	6.0	1.5	50	200	2.0	-65 to +200
MPU233	2N6116	1.0	0.15	5.0	50	25	40	250	6.0	1.5	50	200	2.0	-65 to +200
MPU6027	MPU6027	5.0	2.0	10	70	50	40	375	6.0	1.5	50	200	5.0	-55 to +150
MPU6028	MPU6027	1.0	0.15	10	25	25	40	375	6.0	1.5	50	200	5.0	-55 to +150

TABLE 27 - UNIJUNCTION TRANSISTORS INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered unijunction transistors.

KEY

TYPE		REFERENCE	P_D mW	R_{BB} KΩ		η		I_V mA Min	I_P µA Max	I_{EO} @V_{B2E} µA@V Max	$V_{EB1(sat)}$ @ I_E = 50mA V
				Min	Max	Min	Max				
Alpha-numerical Listing		First type number on data sheet where the part number is located	Power Dissipation @ 25°C	Interbase Resistance		Intrinsic Standoff Ratio		Valley Current	Peak Point Current	Emitter Reverse Current at indicated V_{B2E}	Emitter Saturation Voltage

UNIJUNCTION TRANSISTORS INDEX

TYPE		REFERENCE	P_D mW	R_{BB} KΩ		η		I_V mA Min	I_P µA Max	I_{EO} @ V_{EB2} µA@V Max	$V_{EB1(sat)}$ @ I_E = 50mA V
				Min	Max	Min	Max				
MU10		MU10	300	4.0	10	0.50	0.85	1.0	5.0	1.0 @ 30	2.0
MU20		MU10	300	4.7	9.1	0.56	0.85	1.0	2.0	0.2 @ 30	2.0
MU851		MU851	200	4.7	9.1	0.56	0.75	2.0	2.0	0.1 @ 30	2.5
MU852		MU851	200	4.7	9.1	0.70	0.85	4.0	2.0	0.1 @ 30	2.5
MU853		MU851	200	4.7	9.1	0.70	0.85	4.0	0.4	0.05 @ 30	2.5
MU4891		MU4891	300	4.0	9.1	0.55	0.82	2.0	5.0	0.01 @ 30	4.0
MU4892		MU4891	300	4.0	9.1	0.51	0.69	2.0	2.0	0.01 @ 30	4.0
MU4893		MU4891	300	4.0	12	0.55	0.82	2.0	2.0	0.01 @ 30	4.0
MU4894		MU4891	300	4.0	12	0.74	0.86	2.0	1.0	0.01 @ 30	4.0

TABLE 28 - TRANSISTOR INDEX

This table contains an alpha-numerical listing and short-term specifications for Motorola in-house non-registered transistors.

KEY

TYPE NO.	MATERIAL	POLARITY		REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ Min	I_C	f_T MHz Min Typ*	C_{ob} pF Max Typ*	t_{on} /t_{off} ns Max Typ*	PACKAGE TO- No.	Case No.

Alpha-numerical Listing

S – Silicon
G – Germanium

N – NPN
P – PNP

First type number on data sheet where the part number is located.

USE CODE

A	Amplifier
AH	Amplifier, High frequency
AHP	Amplifier, High frequency power
AL	Amplifier, Light sensitive
AM	Amplifier, Multiple device
AP	Amplifier, Power
AS	Amplifier, Switch
ASM	Amplifier, Switch multiple device
ASP	Amplifier, Switch power
S	Switch
SAH	Switch, Amplifier high frequency
SC	Switch, Chopper
SH	Switch, High speed
SHP	Switch, High speed power
SM	Switch, Multiple device
SP	Switch, Power

PRODUCT CODE

FET	Field-Effect Transistor
OPT	Optoelectronic Device
PUT	Programmable Unijunction Transistor
R-A	Reference Amplifier
THY	Thyristor
UJT	Unijunction Transistor

Power Dissipation. Normally specified at 25°C but occasionally specified at higher temperatures.

REF. POINT:
A – Ambient Temperature
C – Case Temperature

Rated maximum Collector-Emitter Voltage. Subscript letter identifies base termination listed below in order of preference.

SUBSCRIPT:
O – V_{CEO}, open
R – V_{CER}, resistance only
X – V_{CEX}, reverse bias and resistance
V – V_{CEV}, reverse bias only
S – V_{CES}, shorted
U – V_{CE}, unidentified
B – V_{CBO}, Collector-Base Voltage, emitter open

DC Collector Current

JEDEC Transistor Outline/ Motorola Package Outline

Turn-On/Turn-Off Time

Output Capacitance, common-base. Shown without distinction:
C_{cb} – Collector-Base Capacitance
C_{re} – Common-Emitter Reverse Transfer Capacitance

Current-Gain–Bandwidth Product. When specified, indicated by T. When f_T is not specified, the actual specification is indicated by a letter code and f_T is computed as follows:
B: $f_{\alpha b}$, $f_T = f_{\alpha b} \times 0.8$
E: $f_{\alpha e}$, $f_T = f_{\alpha e} \times (h_{FE} \text{ or } h_{fe})$ min
M: f_{max} is shown as specified

Common-emitter DC Current Gain. When not specified, h_{fe} (ac gain) is shown or h_{FE} is calculated from:
h_{FB}, common base dc gain,
h_{fb}, common base ac gain, or from the
I_C and I_B values used for a saturation voltage test.
Units from test current:
A – ampere
m – mA
* – μA

TYPE NO.	MATERIAL	POLARITY	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
BU105	S	N	MJ105	S	10	C	750	R	2.5			7.5*	65*		/11
BU108	S	N	BU108	S	56	C	750	0	5.0			7.5*	125*		/11
MA200	G	P	MA200	A	0.15	A	105	0	0.2	20	5.0 m				5/31
MA201	G	P	MA200	A	0.15	A	105	0	0.2	20	5.0 m				5/31
MA202	G	P	MA200	A	0.15	A	105	0	0.2	40	5.0 m				5/31
MA203	G	P	MA200	A	0.15	A	105	0	0.2	40	5.0 m				5/31
MA204	G	P	MA200	A	0.15	A	90	0	0.2	20	5.0 m				5/31
MA205	G	P	MA200	A	0.15	A	75	0	0.2	20	5.0 m				5/31
MA206	G	P	MA200	A	0.15	A	60	0	0.2	20	5.0 m				5/31
MA909	G	P	MA909	A	0.15	C	75	0	0.2	20	5.0 m				5/31
MA910	G	P	MA909	A	0.15	C	90	0	0.2	20	5.0 m				5/31
MA4404	G	P	MA4404	S	0.2	A	24	S	0.35	30	12 m		25	530/1700	5/31
MA4404A	G	P	MA4404	S	0.2	A	35	S	0.35	30	12 m		25		5/31
MD708	S	N	MD708	SM	0.4	A	15	0	0.2	40	10 m	300	5.0	35/75	78/654
MD708A	S	N	MD708	SM	0.4	A	15	0	0.2	40	10 m	300	5.0	35/75	78/654
MD708AF	S	N	MD708	SM	0.35	A	15	0	0.2	40	10 m	300	5.0	35/75	78/654
MD708B	S	N	MD708	SM	0.4	A	15	0	0.2	40	10 m	300	5.0	35/75	78/654
MD708BF	S	N	MD708	SM	0.35	A	15	0	0.2	40	10 m	300	5.0	35/75	/610A
MD708F	S	N	MD708	SM	0.35	A	15	0	0.2	40	10 m	300	5.0	35/75	/610A
MD918	S	N	MD918	AM	0.4	A	15	0	0.05	50	1.0 m	600	1.7		/654
MD918A	S	N	MD918	AM	0.4	A	15	0	0.05	50	1.0 m	600	1.7		/654
MD918AF	S	N	MD918	AM	0.35	A	15	0	0.05	50	1.0 m	600	1.7		/610A
MD918B	S	N	MD918	AM	0.4	A	15	0	0.05	50	1.0 m	600	1.7		/654
MD918BF	S	N	MD918	AM	0.35	A	15	0	0.05	50	1.0 m	600	1.7		/610A
MD918F	S	N	MD918	AM	0.35	A	15	0	0.05	50	1.0 m	600	1.7		/610A
MD982	S	P	MD982	AM	0.6	A	50	0	0.6	40	150 m	200	80		/654
MD982F	S	P	MD982	AM	0.35	A	50	0	0.6	40	150 m	200	8.0		/610A
MD984	S	P	MD984	AS	3.0	C	20	0	0.2	25	10 m	250	40		/654
MD986	S	N	MD986	ASM	0.35	A	15	0	0.2	25	10 m	200	4.0		/654
MD986F	S	N	MD986	ASM	0.35	A	15	0	0.2	25	10 m	200	4.0		/610A
MD1120	S	N	MD1120	AM	0.575	A	30	0	0.5	50	10 m	200	8.0		/654
MD1120F	S	N	MD1120	AM	0.35	A	30	0	0.5	50	10 m	200	8.0		/610A
MD1121	S	N	MD1120	AM	0.575	A	30	0	0.5	50	10 m	200	8.0		/654
MD1122	S	N	MD1120	AM	0.575	A	30	0	0.5	50	10 m	200	8.0		/654
MD1129	S	N	MD1129	AM	0.575	A	30	0	0.5	100	10 m	200	8.0		/654
MD1129F	S	N	MD1129	AM	0.35	A	30	0	0.5	100	10 m	200	8.0		/610A
MD1130	S	P	MD1130	AM	0.6	A	40	0	0.2	100	100*	200	4.0		/654
MD1130F	S	P	MD1130	AM	0.35	A	40	0	0.2	100	100*	200	4.0		/610A
MD1132	S	N	MD1132	AM	0.3	A	15	0	0.05	50	1.0 m	600	1.7		/654
MD2218	S	N	MD2218	ASM	0.575	A	30	0	0.5	40	150 m	200	8.0		/654
MD2218A	S	N	MD2218	ASM	0.575	A	30	0	0.5	40	150 m	200	8.0		/654
MD2218AF	S	N	MD2218	ASM	0.35	A	30	0	0.5	40	150 m	200	8.0		/610A
MD2218F	S	N	MD2218	ASM	0.35	A	30	0	0.5	40	150 m	200	8.0		/610A
MD2219	S	N	MD2218	ASM	0.575	A	30	0	0.5	100	150 m	200	8.0		/654
MD2219A	S	N	MD2218	ASM	0.575	A	30	0	0.5	100	150 m	200	8.0		/654
MD2219AF	S	N	MD2218	ASM	0.350	A	30	0	0.5	100	150 m	200	8.0		/610A
MD2219F	S	N	MD2218	ASM	0.350	A	30	0	0.5	100	150 m	200	8.0		/610A
MD2369	S	N	MD2369	SM	0.5	A	15	0	0.5	40	10 m	500	4.0	15/20	/654
MD2369A	S	N	MD2369	SM	0.5	A	15	0	0.5	40	10 m	500	4.0	15/20	/654
MD2369AF	S	N	MD2369	SM	0.25	A	15	0	0.5	40	10 m	500	4.0	15/20	/610A
MD2369F	S	N	MD2369	SM	0.25	A	15	0	0.5	40	10 m	500	4.0	15/20	/610A
MD2904	S	P	MD2904	ASM	0.575	A	40	0	0.6	40	150 m	200	8.0	45/130	/654
MD2904A	S	P	MD2904	ASM	0.575	A	60	0	0.6	40	150 m	200	8.0	45/130	/654
MD2904AF	S	P	MD2904	ASM	0.350	A	60	0	0.6	40	150 m	200	8.0	45/130	/610A
MD2904F	S	P	MD2904	ASM	0.350	A	40	0	0.6	40	150 m	200	8.0	45/130	/610A
MD2905	S	P	MD2904	ASM	0.575	A	40	0	0.6	100	150 m	200	8.0	45/130	
MD2905A	S	P	MD2904	ASM	0.575	A	60	0	0.6	100	150 m	200	8.0	45/130	
MD2905AF	S	P	MD2904	ASM	0.35	A	60	0	0.6	100	150 m	200	8.0	45/130	
MD2905F	S	P	MD2904	ASM	0.35	A	40	0	0.6	100	150 m	200	8.0	45/130	
MD3250	S	P	MD3250	AM	0.5	A	40	0	0.05	50	0.1 m	200	6.0		/654
MD3250A	S	P	MD3250	AM	0.5	A	40	0	0.05	50	0.1 m	200	6.0		/654
MD3250AF	S	P	MD3250	AM	0.25	A	40	0	0.05	50	0.1 m	200	6.0		/610A
MD3250F	S	P	MD3250	AM	0.25	A	40	0	0.05	50	0.1 m	200	6.0		/610A
MD3251	S	P	MD3250	AM	0.5	A	40	0	0.05	100	0.1 m	250	6.0		/654
MD3251A	S	P	MD3250	AM	0.5	A	40	0	0.05	100	0.1 m	250	6.0		/654
MD3251AF	S	P	MD3250	AM	0.25	A	40	0	0.05	100	0.1 m	250	6.0		/610A
MD3251F	S	P	MD3250	AM	0.25	A	40	0	0.05	100	0.1 m	250	6.0		/610A
MD3409	S	N	MD3409	AM	0.575	A	30	0	0.5	50	10 m	200	8.0		/654
MD3410	S	N	MD3409	AM	0.575	A	30	0	0.5	50	10 m	200	8.0		/654
MD3467	S	P	MD3467	SM	0.5	A	40	0	1.0	20	500 m	150		40/110	/654

TRANSISTOR INDEX

TYPE NO.	MATERIAL	POLARITY		REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
MD3467F	S	P		MD3467	SM	0.25	A	40	0	1.0	20	500 m	150		40/110	/610A
MD3725	S	N		MD3725	SM	0.5	A	40	0	1.0	50	100 m	250	10	45/75	/654
MD3725F	S	N		MD3725	SM	0.25	A	40	0	1.0	50	100 m	250	10	45/75	/610A
MD3762	S	P		MD3762	SM	0.5	A	40	0	1.5	20	1.0 A	150		40/110	/654
MD3762F	S	P		MD3762	SM	0.25	A	40	0	1.5	20	1.0A	150		40/110	/610A
MD4957	S	P		MD4957	AM	0.2	A	30	0	0.03	20	2.0 m	1.0 G			/654
MD5000	S	P		MD5000	AM	0.3	A	15	0	0.05	20	3.0 m	600	1.7		/654
MD5000A	S	P		MD5000	AM	0.3	A	15	0	0.05	20	3.0 m	600	1.7		/654
MD5000B	S	P		MD5000	AM	0.3	A	15	0	0.05	20	3.0 m	600	1.7		/654
MD6001	S	N		MD6001	ASM	0.5	A	30	0	0.3	40	150 m	200	8.0	60/350	/654
MD6001F	S	N		MD6001	ASM	0.25	A	30	0	0.3	40	150 m	200	8.0	60/350	/610A
MD6002	S	N		MD6001	ASM	0.5	A	30	0	0.3	100	150 m	200	8.0	60/350	/654
MD6002F	S	N		MD6001	ASM	0.25	A	30	0	0.3	100	150 m	200	8.0	60/350	/610A
MD6003	S	N		MD6003	AM	0.5	A	30	0	0.3	70	150 m	200	8.0		/654
MD6003F	S	N		MD6003	AM	0.25	A	30	0	0.3	70	150 m	200	8.0		/610A
MD6100	S	N		MD6100	AM	0.5	A	45	0	0.05	100	0.1 m	30	4.0		/654
MD7000	S	N		MD7000	S	0.575	A	30	0	0.5	70	150 m	200	8.0		/654
MD7001	S	P		MD7001	S	0.6	A	30	0	0.6	70	150 m	200	8.0		/654
MD7001F	S	P		MD7001	S	0.350	A	30	0	0.6	70	150 m	200	8.0		610A
MHQ2221	S	N		MHQ2221	ASM	0.65	A	40	0	0.5	40	150 m	200	8.0	25/250	116/632
MHQ2222	S	N		MHQ2221	ASM	0.65	A	40	0	0.5	100	150 m	200	8.0	25/250	116/632
MHQ2369	S	N		MHQ2369	ASM	0.5	A	15	0	0.5	40	10 m	450	4.0		116/632
MHQ2483	S	N		MHQ2383	AM	0.6	A	40	0	0.05	150	1.0 m	50			116/632
MHQ2484	S	N		MHQ2384	AM	0.6	A	40	0	0.05	300	1.0 m	50			116/632
MHQ2906	S	P		MHQ2906	ASM	0.65	A	40	0	0.6	40	150 m	200	8.0	30/100*	116/632
MHQ2907	S	P		MHQ2906	ASM	0.65	A	40	0	0.6	100	150 m	200	8.0	30/100*	116/632
MHQ3467	S	P		MHQ3467	ASM	0.9	A	40	0	1.0	20	500 m	125	25	40/90	116/632
MHQ3546	S	P		MHQ3546	ASM	0.5	A	12	0	0.2	30	10 m	600	6.0	15/25*	116/632
MHQ3798	S	P		MHQ3798	AM	0.5	A	40	0	0.05	150	0.1 m	60	4.0		116/632
MHQ3799	S	P		MHQ3798	AM	0.5	A	60	0	0.05	300	0.1 m	60	4.0		116/632
MHQ6001	S	N		MHQ6001	ASM	0.65	A	30	0	0.3	40	150 m	200	8.0	30/315*	116/632
MHQ6002	S	N		MHQ6001	ASM	0.65	A	30	0	0.3	100	150 m	200	8.0	30/315*	116/632
MHQ6100	S	N		MHQ6100	AM	0.5	A	40	0	0.05	75	1.0 m	175*	45*		116/632
MHQ6100A	S	N		MHQ6100	AM	0.5	A	45	0	0.05	150	1.0 m	175*	4.5*		116/632
MJ105	S	N		MJ105	S	10	C	750	R	2.5			7.5*	65*		/11
MJ400	S	N		MJ400	AP	6.67	C	325	0	0.25	30	50 m	15	10*		66/80
MJ410	S	N		MJ410	AP	100	C	200	0	5.0	30	1.0 A	2.5			/11
MJ411	S	N		MJ410	AP	100	C	300	0	5.0	30	1.0 A	2.5			/11
MJ413	S	N		MJ413	SP	125	C	400	X	10	20	500 m	2.5			/11
MJ420	S	N		MJ420	AP	2.5	C	250	0	0.1	25	30 m	15	12		5/31
MJ421	S	N		MJ420	AP	2.5	C	325	0	0.1	25	30 m	15	12		5/31
MJ423	S	N		MJ413	SP	125	C	400	X	10	30	1.0 A	2.5			/11
MJ424	S	N		MJ424	AP	100	C	350	0	5.0	30	1.0 A	2.5			/11
MJ425	S	N		MJ424	AP	100	C	400	0	5.0	30	1.0 A	2.5			/11
MJ431	S	N		MJ413	SP	125	C	400	X	10	15	2.5 A	2.5			/11
MJ450	S	P		MJ450	ASP	150	C	40	0	30	20	10 A	2.0			/12
MJ480	S	N		MJ480	AP	87.5	C	40	0	4.0	30	1.0 A	4.0	200		/11
MJ481	S	N		MJ480	AP	87.5	C	60	0	4.0	30	1.0 A	4.0	200		/11
MJ490	S	P		MJ490	AP	87.5	C	40	0	4.0	30	1.0 A	4.0	200		/11
MJ491	S	P		MJ490	AP	87.5	C	60	0	4.0	30	1.0 A	4.0	200		/11
MJ500	S	P		MJ500	ASP	60	C	60	0	70	25	2.0 A	30	300	200/250	59/160A
MJ501	S	P		MJ500	ASP	60	C	80	0	7.0	25	2.0 A	30	300	200/250	59/160A
MJ802	S	N		MJ802	AP	200	C	100	R	30	25	7.5 A	2.0			/11
MJ900	S	P		MJ900	AP	90	C	60	0	8.0	1000	3.0 A				/11
MJ901	S	P		MJ900	AP	90	C	80	0	8.0	1000	3.0 A				/11
MJ920	S	P		MJ920	AP	120	C	60	0	8.0	750	4.0 A	4.0	300		/253
MJ921	S	P		MJ920	AP	120	C	80	0	8.0	750	4.0 A	4.0	300		/253
MJ1000	S	N		MJ900	AP	90	C	60	0	8.0	1000	3.0 A				/11
MJ1001	S	N		MJ900	AP	90	C	80	0	8.0	1000	3.0 A				/11
MJ1200	S	N		MJ920	AP	120	C	60	0	8.0	750	4.0 A	4.0	200		/253
MJ1201	S	N		MJ920	AP	120	C	80	0	8.0	750	4.0 A	4.0	200		/253
MJ1800	S	P		MJ1800	ASP	100	C	250	0	5.0	40	400 m				/11
MJ2249	S	P		MJ2249	ASP	20	C	60	0	2.0	25	500 m	10			66/80
MJ2250	S	P		MJ2249	ASP	20	C	80	0	2.0	25	500 m	10			66/80
MJ2251	S	N		MJ2250	AP	10	C	225	0	0.5	25	50 m	10			66/80
MJ2252	S	N		MJ2250	AP	10	C	300	0	0.5	25	50 m	10			66/80
MJ2254	S	P		MJ2253	ASP	25	C	80	0	3.0	20	250 m	3.0			66/80
MJ2267	S	P		MJ2267	ASP	150	C	40	0	5.0	20	4.0 A	3.0			/11
MJ2268	S	P		MJ2267	ASP	150	C	55	0	5.0	20	4.0 A	3.0			/11

TYPE NO.	MATERIAL	POLARITY	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
MJ2500	S	P	MJ2500	AP	150	C	60	0	10	1000	5.0 A				/11
MJ2501	S	P	MJ2500	AP	150	C	80	0	10	1000	5.0 A				/11
MJ2801	S	N	MJ2801	ASP	115	C	40	0	15	15	8.0 A	1.0			/11
MJ2840	S	N	MJ2840	AP	150	C	60	0	10	20	3.0 A	2.0			/11
MJ2841	S	N	MJ2840	AP	150	C	80	0	10	20	4.0 A	2.0			/11
MJ2901	S	P	MJ2801	ASP	115	C	40	0	15	15	8.0 A	1.0			/11
MJ2940	S	P	MJ2940	AP	150	C	60	0	10	20	3.0 A	4.0			/11
MJ2941	S	P	MJ2940	AP	150	C	80	0	10	20	4.0 A	4.0			/11
MJ2955	S	P	MJ2955	ASP	150	C	70	R	15	20	4.0 A	4.0			/11
MJ3000	S	N	MJ2500	AP	150	C	60	0	10	1000	5.0 A				/11
MJ3001	S	N	MJ2500	AP	150	C	80	0	10	1000	5.0 A				/11
MJ3026	S	N	MJ3026	AP	80	C	275	0	2.0	25	250 m				/11
MJ3027	S	N	MJ3026	AP	80	C	300	0	2.0	25	250 m				/11
MJ3028	S	N	MJ3208	AP	100	C	300	0	3.5	25	0.3 A				/11
MJ3029	S	N	MJ2029	AP	125	C	250	0	5.0	25	0.3 A				/11
MJ3030	S	N	MJ2029	AP	125	C	325	0	5.0	30	0.4 A				/11
MJ3040	S	N	MJ3040	AP	100	C	300	0	7.0	100	2.5 A				/11
MJ3041	S	N	MJ3040	AP	100	C	300	0	7.0	250	2.5 A				/11
MJ3042	S	N	MJ3040	AP	100	C	350	0	7.0	250	2.5 A				/11
MJ3101	S	N	MJ2249	ASP	20	C	40	0	2.0	25	0.5 A	10			66/80
MJ3201	S	N	MJ3201	AP	15	C	225	0	0.1	30	50 m	15			66/80
MJ3202	S	N	MJ3201	AP	15	C	300	0	0.1	30	50 m	15			66/80
MJ3260	S	N	MJ3260	S	80	C	750	R	6.0			7.5*	180		/11
MJ3430	S	P	MJ3430	AP	125	C	300	0	5.0	15	2.5 A	2.5			/11
MJ3480	S	N	BU108	S	56	C	700	0				7.5*	125*		/11
MJ3520	S	N	MJ3520	AP	150	C	40	0	15	500	4.0 A	20	600		3/1
MJ3521	S	N	MJ3521	AP	150	C	80	0	15	500	4.0 A	2.0	600		3/1
MJ3583	S	P	MJ3583	AP	35	C	175	0	1.0	10	1.0 A	10	120		66/80
MJ3584	S	P	MJ3583	ASP	35	C	250	0	2.0	25	10 A	10	120	300/700	66/80
MJ3585	S	P	MJ3583	ASP	35	C	300	0	2.0	25	1.0 A	10	120	300/700	66/80
MJ3701	S	P	MJ2253	ASP	25	C	40	0	3.0	20	250 m	3.0			66/80
MJ3738	S	P	2N3738	AP	20	C	225	0	025	40	100 m	10	20		66/80
MJ3739	S	P	2N3738	AP	20	C	200	0	0.25	40	100 m	10	20		66/80
MJ3771	S	N	2N6257	ASP	200	C	50	X	30	15	15 A	2.0		700/1800	/11
MJ3772	S	N	2N6257	ASP	200	C	80	X	20	15	15 A	2.0		700/1800	/11
MJ3773	S	N	2N6302	ASP	200	C	160	X	16	15	8.0 A	1.0		1500/3800	/11
MJ4000	S	N	MJ4000	AP	75	C	60	0	4.0	1000	1.5 A				/11
MJ4001	S	N	MJ4000	AP	75	C	80	0	4.0	1000	1.5 A				/11
MJ4010	S	P	MJ4000	AP	75	C	60	0	4.0	1000	1.5 A				/11
MJ4011	S	P	MJ4000	AP	75	C	80	0	4.0	1000	1.5 A				/11
MJ4030	S	P	MJ4030	AP	150	C	60	0	16	1000	10 A				/11
MJ4031	S	P	MJ4030	AP	150	C	80	0	16	1000	10 A				/11
MJ4032	S	P	MJ4030	AP	150	C	100	0	16	1000	10 A				/11
MJ4033	S	N	MJ4030	AP	150	C	60	0	16	1000	10 A				/11
MJ4034	S	N	MJ4030	AP	150	C	80	0	16	1000	10 A				/11
MJ4035	S	N	MJ4030	ASP	150	C	100	0	16	1000	10 A				/11
MJ4200	S	N	MJ4200	AP	60	C	60	0	40	750	2.0 A	120		/253	
MJ4201	S	N	MJ4200	AP	60	C	80	0	4.0	750	2.0 A	4.0	120		/253
MJ4210	S	P	MJ4200	AP	60	C	60	0	4.0	750	2.0 A	4.0	200		/253
MJ4211	S	P	MJ4200	AP	60	C	80	0	4.0	750	2.0 A	4.0	200		/253
MJ4240	S	P	MJ3583	ASP	35	C	300	0	2.0	10	0.75 A	15	120	500/900	66/80
MJ4502	S	P	MJ4502	AP	200	C	100	R	30	25	7.5 A	2.0			/12
MJ4645	S	P	MJ4645	AP	5.0	C	200	0	0.5	20	500 m	40	80	200/720	39/79
MJ4646	S	P	MJ4645	AP	5.0	C	300	0	0.5	20	500 m	40	60	200/720	39/79
MJ4647	S	P	MJ4645	AP	5.0	C	400	0	0.5	20	500 m	30	60	200/720	39/79
MJ4648	S	P	MJ4645	AP	5.0	C	350	0	0.5	20	500 m	30	60	200/720	39/79
MJ5415	S	P	MJ5415	AP	1.0	C	200	0	1.0	30	50 m	15	25		39/79
MJ5416	S	P	MJ5415	AP	1.0	C	300	0	1.0	30	50 m	15	25		39/79
MJ6257	S	N	2N6257	ASP	200	C	50	X	20	15	15 A	2.0		700/1800	/11
MJ6302	S	N	2N6302	ASP	200	C	160	X	16	15	8.0 A	1.0		1500/3800	/11
MJ6700	S	P	MJ6700	AP	60	C	60	0	7.0	25	2.0 A	30	300	200/1150	59/160
MJ6701	S	P	MJ6701	ASP	60	C	80	0	7.0	25	2.0 A	30	300	200/1150	59/160
MJ7000	S	N	MJ7000	ASP	150	C	100	0	30	20	10 A	30	600		63/188
MJ7200	S	N	MJ7200	ASP	300	C	80	0	60	20	20 A	20	1200		114/177
MJ7201	S	N	MJ7200	ASP	300	C	100	0	60	20	20 A	20	1200		114/177
MJ8100	S	P	MJ8100	ASP	10	C	60	0	5.0	25	2.0 A	30	300	200/1150	39/79
MJ8101	S	P	MJ8100	ASP	10	C	80	0	5.0	25	2.0 A	30	300	200/1150	39/79
MJ9000	S	N	MJ9000	AP	125	C	325	0	10						/11
MJE105	S	P	MJE105	AP	65	C	50	0	5.0	25	2.0 A				/90
MJE105K	S	P	MJE105	AP	65	C	50	0	5.0	25	2.0 A				/199

TYPE NO.	MATERIAL	POLARITY		REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. Case No.
MJE170	S	P		MJE170	AS	12.5	C	40	0	3.0	50	100 m	50	50		/77
MJE171	S	P		MJE170	AS	12.5	C	60	0	3.0	50	100 m	50	50		/77
MJE172	S	P		MJE170	AS	12.5	C	80	0	3.0	50	100 m	50	50		/77
MJE180	S	N		MJE170	AS	12.5	C	40	0	3.0	50	100 m	50	30		/77
MJE181	S	N		MJE170	AS	12.5	C	60	0	3.0	50	100 m	50	30		/77
MJE182	S	N		MJE170	AS	12.5	C	80	0	3.0	50	100 m	50	30		/77
MJE200	S	N		MJE200	A	15	C	25	0	5.0	45	2.0 A	65	80		/77
MJE205	S	N		MJE205	AP	65	C	50	0	5.0	25	2.0 A				/90
MJE205K	S	N		MJE205	AP	65	C	50	0	5.0	25	2.0 A				/199
MJE210	S	P		MJE200	A	15	C	25	0	5.0	45	2.0 A	65	120		/77
MJE220	S	N		MJE220	AS	15	C	40	0	4.0	40	200 m	50	50		/77
MJE221	S	N		MJE220	AS	15	C	40	0	4.0	40	200 m	50	50		/77
MJE222	S	N		MJE220	AS	15	C	40	0	4.0	25	200 m	50	50		/77
MJE223	S	N		MJE220	AS	15	C	60	0	4.0	40	200 m	50	50		/77
MJE224	S	N		MJE220	AS	15	C	60	0	4.0	40	200 m	50	50		/77
MJE225	S	N		MJE220	AS	15	C	60	0	4.0	25	200 m	50	50		/77
MJE230	S	P		MJE220	AS	15	C	40	0	4.0	40	200 m	50	50		/77
MJE231	S	P		MJE220	AS	15	C	40	0	4.0	40	200 m	50	70		/77
MJE232	S	P		MJE220	AS	15	C	40	0	4.0	25	200 m	50	70		/77
MJE233	S	P		MJE220	AS	15	C	60	0	4.0	40	200 m	50	70		/77
MJE234	S	P		MJE220	AS	15	C	60	0	4.0	40	200 m	50	70		/77
MJE235	S	P		MJE220	AS	15	C	60	0	4.0	25	200 m	50	70		/77
MJE240	S	N		MJE240	AS	15	C	80	0	4.0	40	200 m	40	50		/77
MJE241	S	N		MJE240	AS	15	C	80	0	4.0	40	200 m	40	50		/77
MJE242	S	N		MJE240	AS	15	C	80	0	4.0	25	200 m	40	50		/77
MJE243	S	N		MJE240	AS	15	C	100	0	4.0	40	200 m	40	50		/77
MJE244	S	N		MJE240	AS	15	C	100	0	4.0	25	200 m	40	50		/77
MJE250	S	P		MJE240	AS	40	C	80	0	4.0	40	200 m	40	70		/77
MJE251	S	P		MJE240	AS	40	C	80	0	4.0	40	200 m	40	70		/77
MJE252	S	P		MJE240	AS	40	C	80	0	4.0	25	200 m	40	70		/77
MJE253	S	P		MJE240	AS	15	C	100	0	4.0	40	200 m	40	70		/77
MJE254	S	P		MJE240	AS	15	C	100	0	4.0	25	200 m	40	70		/77
MJE340	S	N		MJE340	AP	20.8	C	300	0	0.5	30	50 m				/77
MJE340K	S	N		MJE340	AP	3.0	C	300	0	0.5	30	50 m				/199
MJE341	S	N		MJE341	AP	20.8	C	150	0	2.5	25	50 m	15	15		/77
MJE341K	S	N		MJE341	AP	30	C	150	0	0.5	25	50 m	15	15		/199
MJE344	S	N		MJE341	AP	20.8	C	200	0	0.5	30	50 m	15	15		/77
MJE344K	S	N		MJE344	AP	30	C	200	0	0.5	30	50 m	15	15		/199
MJE350	S	P		MJE350	S	20	C	300	0	0.5	30	50 m				/77
MJE370	S	P		MJE370	AP	25	C	30	0	3.0	25	1.0 A				/77
MJE370K	S	P		MJE370	AP	40	C	30	0	3.0	25	1.0 A				/199
MJE371	S	P		MJE371	AP	40	C	40	0	4.0	40	1.0 A				/77
MJE371K	S	P		MJE370	AP	60	C	40	0	4.0	40	1.0 A				/199
MJE520	S	N		MJE520	AP	25	C	30	0	3.0	25	1.0 A				/77
MJE520K	S	N		MJE520	AP	40	C	30	0	3.0	25	1.0 A				/199
MJE521	S	N		MJE521	AP	40	C	40	0	4.0	40	1.0 A				/77
MJE521K	S	N		MJE521	AP	60	C	40	0	4.0	40	1.0 A				/199
MJE700	S	P		MJE700	AP	40	C	60	0	4.0	750	1.5 A				/77
MJE701	S	P		MJE700	AP	40	C	60	0	4.0	750	2.0 A				/77
MJE702	S	P		MJE700	AP	40	C	80	0	4.0	750	1.5 A				/77
MJE703	S	P		MJE700	AP	40	C	80	0	4.0	750	2.0 A				/77
MJE710	S	P		MJE710	ASP	20	C	40	0	1.5	40	150 m				/77
MJE711	S	P		MJE710	ASP	20	C	60	0	1.5	40	150 m				/77
MJE712	S	P		MJE710	ASP	20	C	80	0	1.5	40	150 m				/77
MJE720	S	N		MJE720	ASP	20	C	40	0	1.5	40	150 m				/77
MJE721	S	N		MJE720	ASP	20	C	60	0	1.5	40	150 m				/77
MJE722	S	N		MJE720	ASP	20	C	80	0	1.5	40	150 m				/77
MJE800	S	N		MJE700	AP	40	C	60	0	4.0	750	1.5 A				/77
MJE801	S	N		MJE700	AP	40	C	60	0	4.0	750	2.0 A				/77
MJE802	S	N		MJE700	AP	40	C	80	0	4.0	750	1.5 A				/77
MJE803	S	N		MJE700	AP	40	C	80	0	4.0	750	2.0 A				/77
MJE1090	S	P		MJE1090	AP	70	C	60	0	5.0	750	3.0 A				/90
MJE1091	S	P		MJE1090	AP	70	C	60	0	5.0	750	4.0 A				/90
MJE1092	S	P		MJE1090	AP	70	C	80	0	5.0	750	3.0 A				/90
MJE1093	S	P		MJE1090	AP	70	C	80	0	5.0	750	4.0 A				/90
MJE1100	S	N		MJE1090	AP	70	C	60	0	5.0	750	3.0 A				/90
MJE1101	S	N		MJE1090	AP	70	C	60	0	5.0	750	4.0 A				/90
MJE1102	S	N		MJE1090	AP	70	C	80	0	5.0	750	3.0 A				/90
MJE1103	S	N		MJE1090	AP	70	C	80	0	5.0	750	4.0 A				/90
MJE1290	S	P		MJE1290	ASP	90	C	40	0	15	20	5.0 A	3.0			/90

TYPE NO.	MATERIAL	POLARITY		REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
MJE1291	S	P		MJE1290	ASP	90	C	60	0	15	20	5.0 A	3.0			/90
MJE1660	S	N		MJE1290	ASP	90	C	40	0	15	20	5.0 A	3.0			/90
MJE1661	S	N		MJE1290	ASP	90	C	60	0	15	20	5.0 A	3.0			/90
MJE2010	S	P		MJE2010	ASP	80	C	40	0	5.0	25	1.0 A	3.0			/199
MJE2011	S	P		MJE2010	ASP	80	C	60	0	5.0	25	1.0 A	3.0			/199
MJE2020	S	N		MJE2010	ASP	80	C	40	0	5.0	25	1.0 A	3.0			/199
MJE2021	S	N		MJE2010	ASP	80	C	60	0	5.0	25	1.0 A	3.0			/199
MJE2050	S	N		MJE2050	AP	15	C	45	0	5.0	50	2.0 A				/77
MJE2090	S	P		MJE1090	AP	70	C	60	0	5.0	750	3.0 m				/199
MJE2091	S	P		MJE1090	AP	70	C	60	0	5.0	750	4.0 m				/199
MJE2092	S	P		MJE1090	AP	70	C	80	0	5.0	750	3.0 m				/199
MJE2093	S	P		MJE1090	AP	70	C	80	0	5.0	750	4.0 m				/199
MJE2100	S	N		MJE1090	AP	70	C	60	0	5.0	750	3.0 m				/199
MJE2101	S	N		MJE1090	AP	70	C	60	0	5.0	750	4.0 m				/199
MJE2102	S	N		MJE1090	AP	70	C	80	0	5.0	750	3.0 m				/199
MJE2103	S	N		MJE1090	AP	70	C	80	0	5.0	750	4.0 m				/199
MJE2150	S	N		MJE2050	AP	15	C	45	0	5.0	50	2.0 A				/77
MJE2160	S	N		MJE2160	A	50	C	300	0	1.5	30	500 m				/199
MJE2360	S	N		MJE2360	AP	30	C	350	0	0.5	25	50 m	10	20		/199
MJE2361	S	N		MJE2360	AP	30	C	350	0	0.5	50	50 m	10*	20*		/199
MJE2370	S	P		MJE2370	ASP	40	C	40	0	3.0	40	0.2 A	3.0			/199
MJE2371	S	P		MJE2370	ASP	40	C	60	0	3.0	40	0.2 A	3.0			/199
MJE2480	S	N		MJE2480	ASP	60	C	40	0	4.0	20	1.5 A	2.0			/199
MJE2481	S	N		MJE2480	ASP	60	C	60	0	4.0	20	1.5 A	2.0			/199
MJE2482	S	N		MJE2480	ASP	60	C	40	0	4.0	20	2.5 A	2.0			/199
MJE2483	S	N		MJE2480	ASP	60	C	60	0	4.0	20	2.5 A	2.0			/199
MJE2490	S	P		MJE2490	ASP	60	C	40	0	3.0	20	1.0 A	3.0			/199
MJE2491	S	P		MJE2490	ASP	60	C	60	0	3.0	20	1.0 A	3.0			/199
MJE2520	S	N		MJE2520	ASP	40	C	40	0	3.0	10	1.0 A	3.0			/199
MJE2521	S	N		MJE2520	ASP	40	C	60	0	3.0	10	1.0 A	3.0			/199
MJE2522	S	N		MJE2520	ASP	40	C	40	0	3.0	20	1.0 A	3.0			/199
MJE2523	S	N		MJE2520	ASP	40	C	60	0	10	25	3.0 A				/199
MJE2801	S	N		MJE2801	AP	90	C	60	0	10	25	3.0 A				/199
MJE2801K	S	N		MJE2801	AP	90	C	60	0	10	25	3.0 A				/199
MJE2901	S	P		MJE2901	AP	90	C	60	0	10	25	3.0 A				/90
MJE2901K	S	P		MJE2901	AP	90	C	60	0	10	25	3.0 A				/199
MJE2955	S	P		MJE2955	ASP	90	C	60	0	10	20	4.0 A	2.0			/90
MJE2955K	S	P		MJE2955	ASP	90	C	60	0	10	20	4.0 A	2.0			/199
MJE3054	S	N		MJE3054	ASP	40	C	55	0	4.0	40	0.5 A				/199
MJE3055	S	N		MJE3055	ASP	90	C	60	0	10	20	4.0 A	2.0			/90
MJE3055K	S	N		MJE3055	ASP	90	C	60	0	10	20	4.0 A	2.0			/199
MJE3370	S	P		MJE3370	AP	25	C	30	0	3.0	25	1.0 A				/77
MJE3371	S	P		MJE371	AP	40	C	40	0	4.0	40	1.0 A				/77
MJE3439	S	N		MJE3439	AP	15	C	350	0	0.3	40	20 m	15	10		/77
MJE3440	S	N		MJE3439	AP	15	C	250	0	0.3	40	20 m	15	10		/77
MJE3520	S	N		MJE3520	AP	25	C	30	0	3.0	25	1.0 A				/77
MJE3521	S	N		MJE3520	AP	40	C	40	0	4.0	40	1.0 A				/77
MJE3738	S	N		MJE3738	AP	30	C	225	0	0.5	40	100 m	10*	20*		/199
MJE3739	S	N		MJE3739	AP	30	C	300	0	0.5	40	100 m	10*	20*		/199
MJE3740	S	P		MJE3740	SP	40	C	60	0	4.0	30	250 m	4.0	100		/199
MJE3741	S	P		MJE3740	SP	40	C	80	0	4.0	30	250 m	4.0	100		/199
MJE4918	S	P		2N4918	AP	40	C	40	0	1.0	10	1.0 A	3.0	100		/199
MJE4919	S	P		2N4918	AP	40	C	60	0	1.0	10	1.0 A	3.0	100		/199
MJE4920	S	P		2N4918	AP	40	C	80	0	1.0	10	1.0 A	3.0	100		/199
MJE4921	S	N		2N4921	AP	40	C	40	0	1.0	10	1.0 A	3.0	100		/199
MJE4922	S	N		2N4921	AP	40	C	60	0	1.0	10	1.0 A	3.0	100		/199
MJE4923	S	N		2N4921	AP	40	C	80	0	1.0	10	1.0 A	3.0	100		/199
MJE5190	S	N		2N5190	AP	60	C	40	0	4.0	25	1.5 A	2.0			/199
MJE5191	S	N		2N5190	AP	60	C	60	0	4.0	25	1.5 A	2.0			/199
MJE5192	S	N		2N5190	AP	60	C	80	0	4.0	20	1.5 A	2.0			/199
MJE5193	S	P		2N5193	AP	60	C	40	0	4.0	25	1.5 A	2.0			/199
MJE5194	S	P		2N5193	AP	60	C	60	0	4.0	25	1.5 A	2.0			/199
MJE5195	S	P		2N5193	AP	60	C	80	0	4.0	20	1.5 A	2.0			/199
MJE5655	S	N		2N5655	AP	30	C	250	0	0.5	30	100 m	10	25		/199
MJE5656	S	N		2N5655	AP	30	C	300	0	0.5	30	100 m	10	25		/199
MJE5657	S	N		2N5655	AP	30	C	350	0	0.5	30	100 m	10	25		/199
MJE5974	S	P		2N5974	AP	75	C	40	0	5.0	20	2.5 A	2.0	300		/199
MJE5975	S	P		2N5974	AP	75	C	60	0	5.0	20	2.5 A	2.0	300		/199
MJE5976	S	P		2N5974	AP	75	C	80	0	5.0	20	2.5 A	2.0	300		/199
MJE5977	S	N		2N5977	AP	75	C	40	0	5.0	20	2.5 A	2.0	200		/199

TYPE NO.	MATERIAL	POLARITY	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No.	PACKAGE Case No.
MJE5978	S	N	2N5977	AP	75	C	60	0	5.0	20	2.5 A	2.0	200			199
MJE5979	S	N	2N5977	AP	75	C	80	0	5.0	20	2.5 A	2.0	200			199
MJE5980	S	P	2N5980	AP	90	C	40	0	8.0	20	4.0 A	2.0	350			199
MJE5981	S	P	2N5980	AP	90	C	60	0	8.0	20	4.0 A	2.0	350			199
MJE5982	S	P	2N5980	AP	90	C	80	0	8.0	20	4.0 A	2.0	350			199
MJE5983	S	N	2N5983	AP	90	C	80	0	8.0	20	4.0 A	2.0	250			199
MJW5984	S	N	2N5983	AP	90	C	60	0	8.0	20	4.0 A	2.0	250			199
MJE5985	S	N	2N5983	AP	90	C	80	0	8.0	20	4.0 A	2.0	250			199
MJE6040	S	P	2N6040	AP	75	C	60	0	8.0	1000	4.0 A	4.0	300			90
MJE6041	S	P	2N6040	AP	75	C	80	0	8.0	1000	4.0 A	4.0	300			90
MJE6043	S	P	2N6040	AP	75	C	100	0	8.0	1000	3.0 A	4.0	300			90
MJE6043	S	N	2N6040	AP	75	C	60	0	8.0	1000	4.0 A	4.0	200			90
MJE6044	S	N	2N6040	AP	75	C	80	0	8.0	1000	4.0 A	4.0	200			90
MJE6045	S	N	2N6040	AP	75	C	100	0	8.0	1000	3.0 A	4.0	200			90
MM869B	S	P	2N869A	S	0.36	A	30	0	0.2	40	10 m	400	6.0	50/80	18	22
MM1500,A	S	N	MM1500,A	AH	3.5	C	15	0	0.2			1500	5.0		107	23
MM1501,A	S	N	MM1500,A	AH	3.5	C	15	0	0.2			100	5.0		107	23
MM1553	S	N	MM1553	AHP	0.08	C	70	0	8.0	15	2.0 A		85			145C
MM1748	S	N	MM1748	S	0.3	A	6	0	0.1	20	10 m	600	3.0	15/15	52	27
MM1941	S	N	MM1941	AH	0.3	A	30	S	0.2	25	10 m	600	2.5		18	22
MM2258	S	N	MM2258	AH	1.0	A	120	0	0.5	50	10 m	150	9.0		5	31
MM2259	S	N	MM2258	AH	1.0	A	175	0	0.3	35	10 m	150	8.0		5	31
MM2260	S	N	MM2258	AH	1.0	A	175	0	0.3	50	10 m	150	8.0		5	31
MM2484	S	N	MM2484	A	1.2	C	60	0	0.05	250	1.0 m	60	6.0		18	22
MM2894A	S	P	MM2894	SH	0.36	A	12	0	0.2	40	30 m	800	4.5	60/35	18	22
MM3000	S	N	MM3000	AH	1.0	A	100	0	0.2	20	10 m	150	7.0		39	79
MM3001	S	N	MM3000	AH	1.0	A	150	0	0.2	20	10 m	150	7.0		39	79
MM3002	S	N	MM3000	AH	1.0	A	200	0	0.05	20	10 m	150	15		39	79
MM3003	S	N	MM3000	AH	1.0	A	250	0	0.05	20	10 m	150	15		39	79
MM3005	S	N	MM3005	AS	1.0	A	60	0	2.5	50	150 m	50	15		39	79
MM3006	S	N	MM3005	AS	1.0	A	80	0	2.5	50	200 m	50	15		39	79
MM3007	S	N	MM3005	AS	1.0	A	100	0	2.5	50	250 m	50	15		39	79
MM3008	S	N	MM3008	AH	1.0	A	120	0	0.4	30	1.0 m	50			39	79
MM3009	S	N	MM3008	AH	1.0	A	180	0	0.4	30	1.0 m	50			39	79
MM3019	S	N	MM3019	AS	1.0	A	80	0	1.0	100	150 m	80	12		39	79
MM3020	S	N	MM3019	AS	1.0	A	80	0	1.0	40	150 m	80	12		39	79
MM3053	S	N	MM3053	AS	1.0	A	50	0	10	40	150 m	100	10		39	79
MM3375	S	N	MM3375	AHP	11.6	C	35	0	1.5				10		60	36
MM3375A	S	N	MM3375A	AHP	11.6	C	35	0	1.5				10		60	36
MM3726	S	P	MM3726	SH	1.0	A	50	0	1.5	30	500 m	200		30/90	5	31
MM3736	S	N	MM3736	AS	2.0	C	30	0	1.5	30	1.0 A	200	9.0	45/65	46	26
MM3737	S	N	MM3736	AS	2.0	C	50	0	1.5	20	1.0 A	200	9.0	45/65	46	26
MM3903	S	N	MM3903	AS	0.36	A	40	0	0.2	50	10 m	250	5.0	70/220	52	27
MM3904	S	N	MM3903	AS	0.36	A	40	0	0.2	100	10 m	300	5.0	70/250	52	27
MM3905	S	P	MM3905	AS	0.36	A	40	0	0.2	50	10 m	200	4.0	70/260	52	27
MM3906	S	P	MM3905	AS	0.36	A	40	0	0.2	100	10 m	250	5.0	70/300	52	27
MM4000	S	P	MM4000	AH	0.6	A	100	0	0.1	20	10 m		6.0		39	79
MM4001	S	P	MM4000	AH	1.0	A	150	0	0.5	20	10 m		10		39	79
MM4002	S	P	MM4000	AH	1.0	A	200	0	0.5	20	10 m		20		39	79
MM4003	S	P	MM4000	AH	1.0	A	250	0	0.5	20	10 m		20		39	79
MM4018	S	P	MM4018	AH	5.0	C	30	0	0.4	10	50 m	900*	3.5*		39	79
MM4019	S	P	MM4019	AH	5.0	C	40	0	1.0	10	250 m	750*	7.5*		39	79
MM4049	S	P	MM4049	AH	0.2	A	10	0	0.03	20	25 m	4.0 G	1.25		72	20
MM4052	S	P	MM4052	SC	0.5	A	30	0	0.5	20	10 m		10		46	26
MM4208	S	P	MM4208	SH	0.36	A	12	0	0.2	30	10 m	850	3.0	15/20	18	22
MM4208A	S	P	MM4208	SH	0.36	A	15	0	0.2	30	10 m	850	3.0	15/20	18	22
MM4209	S	P	MM4208	SH	0.36	A	12	0	0.2	50	10 m	850	3.0	15/20	18	22
MM4209A	S	P	MM4208	SH	0.36	A	15	0	0.2	50	10 m	850	3.0	15/20	18	22
MM4258	S	P	MM4257	SH	0.36	A	12	0	0.08	30	10 m	700		15/20	18	22
MM4261H	S	P	MM4261H	S	0.2	A	15	0	0.03	30	10 m	1500	2.5	5.0/5.0	72	20
MM4404	G	P	MA4404	S	0.15	A	24	S	0.25	30	12 m		20	190/300*	18	22
MM4404A	G	P	MA4404	S	0.15	A	35	S	0.25	30	12 m		20		18	22
MM5005	S	P	MM5005	SAH	1.5	A	60	0	2.0	50	150 m	30	20		39	79
MM5006	S	P	MM5005	SAH	1.5	A	80	0	2.0	50	200 m	30	20		39	79
MM5007	S	P	MM5005	SAH	1.5	A	100	0	2.0	50	250 m	30	20		39	79
MM8000	S	N	MM8000	AH	3.5	C	30	0	0.4	30	50 m	550	3.5		39	79
MM8001	S	N	MM8000	AH	3.5	C	30	0	0.4	30	50 m	700	3.5		39	79
MM8003	S	N	MM8003	AH	5.0	C	30	0	0.4	30	50 m	1000	4.0			144B
MM8006	S	N	MM8006	AH	0.2	A	10	0	0.02	25	1.0 m	1000			72	20

TYPE NO.	MATERIAL	POLARITY	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min	I_C	f_T MHz Min	C_{ob} pF Max	t_{on}/t_{off} ns Max	PACKAGE TO- No. / Case No.
MM8007	S	N	MM8006	AH	0.2	A	10	O	0.02	25	1.0 m	1000			72/20
MM8008	S	N	MM8008	A	3.5	C	30	O	0.1			1100*	3.0		107/23
MM8009	S	N	MM8009	AH	3.5	C	35	O	0.4	20	100 m	1000	3.0		39/79
MM8010	S	N	MM8008	A	3.5	C	30	O	0.1			1100*	3.0		107/23
MM8011	S	N	MM8008	A	3.5	C	30	O	0.1			1100*	3.0		107/23
MMCM918	S	N	MMCM918	A	0.2	A	15	O	0.05	20	3.0 m	600	1.7		/176
MMCM930	S	N	MMCM930	A	0.2	A	45	O	0.05	150	1.0 m	60	6.0		/176
MMCM2222	S	N	MMCM2222	SAH	0.2	A	30	O		100	150 m	200	8.0	16/160*	/176
MMCM2369	S	N	MMCM2369	SH	0.2	A	15	O	0.2	40	10 m	500	4.0	12/18	/176
MMCM2484	S	N	MMCM2484	A	0.2	A	60	O	0.05	250	1.0 m	60	60		/176
MMCM2907	S	P	MMCM2907	SAH	0.2	A	40	O	0.6	100	150 m	200	80	20/150*	/176
MMT70	S	N	MMT70	A	0.225	A	20	O	0.05	150	2.0 m		8.0		/28
MMT71	S	P	MMT71	A	0.225	A	20	O	0.05	150	2.0 m		6.0		/28
MMT72	S	N	MMT72	SH	0.225	A	10	O	0.2	30	10 m	400	6.0	20/30	/28
MMT73	S	P	MMT73	SH	0.225	A	8	O	0.2	30	10 m	400	5.0	30/30	/28
MMT74	S	N	MMT74	A	0.225	A	12	O	0.04	25	3.0 m	700			/28
MMT75	S	P	MMT75	SAH	0.225	A	20	O	0.2	50	10 m		5.0	43/155*	/28
MMT76	S	N	MMT75	SAH	0.225	A	20	O	0.2	50	10 m		5.0	37/136*	/28
MMT806	S	N	MMT806	SH	0.225	A	5	O		50		1200	0.6		/28
MMT807	S	N	MMT807	AH	0.225	A	5	O		25	1.0 m	1200	0.55		/28
MMT808	S	P	MMT808	SH	0.225	A	5	O		50	0.1 m	1200	0.8		/28
MMT809	S	P	MMT809	AH	0.225	A	5	O		25	1.0 m	1200	0.8		/28
MMT918	S	N	MMCM918	A	0.225	A	15	O	0.05	20	3.0 m	600	1.7		/28
MMT930	S	N	MMCM930	A	0.225	A	45	O	0.05	150	1.0 m	60	6.0		/28
MMT2222	S	N	MMCM2222	SH	0.225	A	30	O		100	150 m	200	8.0	16/160*	/28
MMT2369	S	N	MMCM2369	SH	0.225	A	15	O	0.2	40	10 m	500	4.0	12/18	/28
MMT2484	S	N	MMCM2484	A	0.225	A	60	O	0.05	250	1.0 m	60	6.0		/28
MMT2857	S	N	MMCM2857	A	0.225	A	15	O	0.04	30	3.0 m	1000			/28
MMT2907	S	P	MMT2907	SAH	0.225	A	40	O	0.6	100	150 m	200	8.0	20/150*	/28
MMT3014	S	N	MMT3014	SH	0.225	A	20	O	0.2	50	30 m	350	5.0	16/25	/28
MMT3546	S	P	MMT3546	SH	0.225	A	12	O	0.25	30	10 m	700	6.0	25/35	/28
MMT3798	S	P	MMT3798	A	0.225	A	60	O	0.05	150	1.0 m	40	4.0		/28
MMT3799	S	P	MMT3798	A	0.225	A	60	O	0.05	300	1.0 m	40	4.0		/28
MMT3903	S	N	MMT3903	SAH	0.225	A	40	O	0.2	50	10 m	250	4.0	37/136*	/28
MMT3904	S	N	MMT3903	SAH	0.225	A	40	O	0.2	100	10 m	300	4.0	37/136*	/28
MMT3905	S	P	MMT3905	SAH	0.225	A	40	O	0.2	50	10 m	200	4.5	43/155*	/28
MMT3906	S	P	MMT3905	SAH	0.225	A	40	O	0.2	100	10 m	250	4.5	43/155*	/28
MMT3960	S	N	MMT3960	SH	0.225	A	3	O		100	10 m	1600	2.0	0.95/1.05*	/28
MMT3960A	S	N	MMT3960A	SH	0.225	A	8	O		30	10 m	1600	2.0	1.0/1.1	/28
MMT8015	S	N	MMT8015	A	0.2	A	10	O	0.015	25	1.0 m	1000			/28
MP110	G	P	MP110	AP	106	C	65	X	7.0	74	1.0 A	320k*			/11
MP110B	G	P	MP110B	AP	106	C	40	O	25	55	5.0 A	500k			/11
MP500,A	G	P	MP500	AP	170	C	30	O	60	30	15 A	2.0kE			68/7
MP501,A	G	P	MP500	AP	170	C	45	O	60	30	15 A	2.0kE			68/7
MP502,A	G	P	MP500	AP	170	C	60	O	60	30	15 A	2.0kE			68/7
MP504,A	G	P	MP500	AP	170	C	30	O	60	50	15 A	2.0kE			68/7
MP505,A	G	P	MP500	AP	170	C	45	O	60	50	15 A	2.0kE			68/7
MP506,A	G	P	MP500	AP	170	C	60	O	60	50	15 A	2.0kE			68/7
MP525	G	P	MP525	AP	106	C	60	X	7.0	30	3.0 A				/3
MP600	G	P	MP600	SP	85	C	50	O	2.5	50	5.0 A				/11A
MP601	G	P	MP600	SP	85	C	60	O	2.5	50	5.0 A				/11A
MP602	G	P	MP600	SP	85	C	70	O	2.5	50	5.0 A				/11A
MP603	G	P	MP600	SP	85	C	80	O	2.5	50	5.0 A				/11A
MP800	G	P	MP800	AP	250	C	60	O	150	15	150 A				/11A
MP801	G	P	MP800	AP	250	C	45	O	150	15	150 A				/11A
MP1612	G	P	MP1612	AP	85	C	100	S	20	25	10 A				/11A
MP1612A	G	P	MP1612	AP	85	C	140	S	20	25	10 A				/11A
MP1612B	G	P	MP1612	AP	85	C	160	S	20	25	10 A				/11A
MP1613	G	P	MP1613	AP	85	C	75	O	7.0	40	1.0 A				/11
MP2000A	G	P	MP2000A	SP	106	C	30	O	25	25	8.0 A	430k*		1100/2100*	/11A
MP2060	G	P	MP2060	AP	85	C	25	O	7.0	30	3.0 A	600k*			/11A
MP2061	G	P	MP2060	AP	85	C	35	O	7.0	30	3.0 A	600k*			/11A
MP2062	G	P	MP2060	AP	85	C	50	O	7.0	30	3.0 A	600k*			/11
MP2063	G	P	MP2060	AP	85	C	60	O	7.0	30	3.0 A	600k*		1100/2100*	/11
MP2100A	G	P	MP2000A	SP	106	C	60	O	2.5	25	8.0 A	430k*			/11A
MP2200A	G	P	MP2000A	SP	106	C	80	O	25	25	8.0 A	430k*		1100/2100*	/11A
MP2300A	G	P	MP2000A	SP	106	C	100	O	25	25	8.0 A	430k*		1100/2100*	/11A
MP2400A	G	P	MP2000A	SP	106	C	120	O	25	25	8.0 A	430k*		1100/2100*	/11A
MP3730	G	P	MP3730	AP	56	C	200	S	50	10	50 m	1.0			/11A
MP3731	G	P	MP3730	AP	56	C	320	S	10	15	60 A	1.0			/11A

TYPE NO.	MATERIAL	POLARITY		REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
MPM5006	S	N		MPM5006	A	0.31	A	40	0	0.1	30	4.0 m		1.6		92/29
MPQ918	S	N		MPQ918	AM	0.625	A	15	0	0.05	20	3.0 m	600	1.7		/646
MPQ2221	S	N		MHQ2221	ASM	0.65	A	40	0	0.5	40	150 m	200	8.0		/646
MPQ2222	S	N		MHQ2221	ASM	0.65	A	40	0	0.5	100	150 m	200	8.0		/646
MPQ2369	S	N		MHQ2369	ASM	0.5	A	15	0	0.5	40	10 m	450	4.0		/646
MPQ2483	S	N		MPQ2483	AM	0.625	A	40	0	0.05	150	1.0 m	50			/646
MPQ2484	S	N		MPQ2483	AM	0.625	A	40	0	0.05	300	1.0 m	50			/646
MPQ2906	S	P		MHQ2906	ASM	0.65	A	40	0	0.6	40	150 m	200	8.0	30/100*	/646
MPQ2907	S	P		MHQ2906	ASM	0.65	A	40	0	0.6	100	150 m	200	8.0	30/100*	/646
MPQ3303	S	N		MPQ3303	ASM	1.0	A	12	0		40	300 m	400	10	15/20	/646
MPQ3467	S	P		MPQ3467	ASM	0.650	A	40	0	1.0	20	500 m	125	25	40/90	/646
MPQ3546	S	P		MHQ3546	ASM	0.5	A	12	0	3.2	30	10 m	600	6.0	15/25*	/646
MPQ3725	S	N		MPQ3725	SM	1.0	A	40	0		35	100 m	250	10	35/60	/646
MPQ3798	S	P		MPQ3798	AM	0.625	A	40	0	0.05	150	0.1 m	60	4.0		/646
MPQ3799	S	P		MPQ3798	AM	0.625	A	60	0	0.05	300	0.1 m	60	4.0		/646
MPQ6001	S	N		MPQ6001	ASM	0.625	A	30	0	0.5	40	150 m	200	8.0	30/225*	/646
MPQ6002	S	N		MPQ6001	ASM	0.625	A	30	0	0.5	100	150 m	200	8.0	30/225*	/646
MPQ6100	S	N		MPQ6100	AM	0.625	A	40	0	0.05	75	1.0 m	50	4.0		/646
MPQ6100A	S	S		MPQ6100	AM	0.625	A	45	0	0.05	150	1.0 m	50	4.0		/646
MPS404	S	P		MPS404	S	0.31	A	24	0	0.15	30	12 m	4.0 B	20	265/385	92/29
MPS404A	S	P		MPS404	S	0.31	A	35	0	0.15	30	12 m	4.0 B	20	265/385	92/29
MPS706	S	N		MPS706	SH	0.31	A	20	R		20	10 m	200	6.0	40/75	92/29
MPS706A	S	N		MPS706	SH	0.31	A	20	R		20	10 m	200	6.0	40/75	92/29
MPS834	S	N		MPS834	SH	0.31	A	30	S	0.2	25	10 m	350	4.0	16/30	92/29
MPS918	S	N		MPS918	A	0.31	A	15	0		20	3.0 m	600	1.7		92/29
MPS2369	S	N		MPS2369	SH	0.31	A	15	0	0.5	40	10 m	500	4.0	12/18	92/29
MPS2711	S	N		MPS2711	A	0.31	A	18	0	0.1	30	2.0 m		4.0		92/29
MPS2712	S	N		MPS2711	A	0.31	A	18	0	0.1	75	2.0 m				92/29
MPS2713	S	N		MPS2713	S	0.31	A	18	0	0.2	30	2.0 m	250	2.5*	13/21*	92/29
MPS2714	S	N		MPS2713	S	0.31	A	18	0	0.2	75	2.0 m	250	2.5*	13/21*	92/29
MPS2923	S	N		MPS2923	AS	0.2	A	25	0	0.1				12		92/29
MPS2924	S	N		MPS2923	AS	0.2	A	25	0	0.1				12		92/29
MPS2925	S	N		MPS2923	AS	0.2	A	25	0	0.1				12		92/29
MPS2926	S	N		MPS2926	AS	0.31	A	18	0	0.1			300	3.5		92/29
MPS3392	S	N		MPS3392	A	0.31	A	25	0	0.1	150	2.0 m		3.5		92/29
MPS3393	S	N		MPS3392	A	0.31	A	25	0	0.1	90	2.0 m		3.5		92/29
MPS3394	S	N		MPS3392	A	0.31	A	25	0	0.1	55	2.0 m		3.5		92/29
MPS3395	S	N		MPS3392	A	0.31	A	25	0	0.1	150	2.0 m		3.5		92/29
MPS3563	S	N		MPS918	AH	0.31	A	12	0	0.5	20	8.0 m	600	1.7		92/29
MPS3638	S	P		MPS3638	SAH	0.31	A	25	0	0.5	30	50 m	100	20	75/170	92/29
MPS3638A	S	P		MPS3638	SAH	0.31	A	25	0	0.5	100	50 m	150	10	75/170	92/29
MPS3639	S	P		MPS3639	S	0.2	A	6	0	0.08	30	10 m		3.5	25/25	92/29
MPS3640	S	P		MPS3640	S	0.31	A	12	0	0.08	30	10 m	500	3.5	25/35	92/29
MPS3646	S	N		MPS3646	SH	0.2	A	15	0	0.2	30	30 m	350	5.0	18/28	92/29
MPS3693	S	N		MPS3693	AH	0.31	A	45	0		40	10 m	200	3.5		92/29
MPS3694	S	N		MPS3694	AH	0.31	A	45	0		100	10 m	200	3.5		92/29
MPS3702	S	P		MPS3702	AH	0.31	A	25	0	0.2	60	50 m	100	12		92/29
MPS3703	S	P		MPS3702	AH	0.31	A	30	0	0.2	30	50 m	100	12		92/29
MPS3704	S	N		MPS3704	AH	0.31	A	30	0	0.6	100	50 m	100	12		92/29
MPS3705	S	N		MPS3704	AH	0.31	A	30	0	0.6	50	50 m	100	12		92/29
MPS3706	S	N		MPS3704	AH	0.31	A	20	0	0.6	30	50 m	100	12		92/29
MPS3707	S	N		MPS3707	A	0.31	A	30	0	0.03	100	0.1 m				92/29
MPS3708	S	N		MPS3707	A	0.31	A	30	0	0.03	45	1.0 m				92/29
MPS3709	S	N		MPS3707	A	0.31	A	30	0	0.03	45	1.0 m				92/29
MPS3710	S	N		MPS3707	A	0.31	A	30	0	0.03	90	1.0 m				92/29
MPS3711	S	N		MPS3707	A	0.31	A	30	0	0.03	180	1.0 m				92/29
MPS3721	S	N		MPS2926	AS	0.31	A	18	0	0.1				3.5		92/29
MPS4354	S	P		MPS4354	APS	0.625	A	60	0	1.0	50	10 m	100		100/400	92/29
MPS4355	S	P		MPS4354	APS	0.625	A	60	0	1.0	100	10 m	100		100/400	92/29
MPS4356	S	P		MPS4354	APS	0.625	A	80	0	1.0	50	10 m	100		100/400	92/29
MPS5172	S	N		MPS5172	AH	0.21	A	25	0	0.1	100	10 m	120*			92/29
MPS6507	S	N		MPS6507	A	0.21	A	20	0	0.1	25	2.0 m	700	2.5		92/29
MPS6511	S	N		MPS6511	AH	0.31	A	20	0	0.1	25	10 m		2.5		92/29
MPS6512	S	N		MPS6512	AH	0.31	A	30	0	0.1	50	2.0 m	250*	3.5		92/29
MPS6513	S	N		MPS6512	AH	0.31	A	30	0	0.1	90	2.0 m	250*		92/29	
MPS6514	S	N		MPS6512	AH	0.31	A	25	0	0.1	150	2.0 m	390*	3.5		92/29
MPS6515	S	N		MPS6512	AH	0.31	A	25	0	0.1	250	2.0 m	390*	3.5		92/29
MPS6516	S	P		MPS6516	AH	0.31	A	40	0	0.1	50	2.0 m	200*	4.0		92/29
MPS6517	S	P		MPS6516	AH	0.31	A	40	0	0.1	90	2.0 m	200*	4.0		92/29
MPS6518	S	P		MPS6516	AH	0.31	A	40	0	0.1	150	2.0 m	340*	4.0		92/29

TRANSISTOR INDEX

MPS6519-MPS-D51

TYPE NO.	MATERIAL	POLARITY	REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C Min		f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
MPS6519	S	P	MPS6516	AH	0.31	A	25	0	0.1	250	2.0 m	340*	4.0		92/29
MPS6520	S	N	MPS6520	AH	0.31	A	25	0	0.1	200	2.0 m	390*	3.5		92/29
MPS6521	S	N	MPS6520	AH	0.31	A	25	0	0.1	300	2.0 m	390*	3.5		92/29
MPS6522	S	P	MPS6520	AH	0.31	A	25	0	0.1	200	2.0 m	340*	3.5		92/29
MPS6523	S	P	MPS6520	AH	0.31	A	25	0	0.1	300	2.0 m	340*	3.5		92/29
MPS6530	S	N	MPS6530	AH	0.31	A	40	0	0.6	40	100 m	390*	5.0		92/29
MPS6531	S	N	MPS6530	AH	0.31	A	40	0	0.6	90	100 m	390*	5.0		92/29
MPS6532	S	N	MPS6530	AH	0.31	A	30	0	0.6	30	100 m	390*	5.0		92/29
MPS6533	S	P	MPS6530	AH	0.31	A	40	0	0.6	40	100 m	260*	6.0		92/29
MPS6534	S	P	MPS6530	AH	0.31	A	40	0	0.6	90	100 m	260*	6.0		92/29
MPS6535	S	P	MPS6530	AH	0.31	A	30	0	0.6	30	100 m	260*	6.0		92/29
MPS6539	S	N	MPS6539	AH	0.31	A	20	0		20	4.0 m	500			92/29
MPS6540	S	N	MPS6540	AH	0.31	A	30	0		25	2.0 m	350			92/29
MPS6542	S	N	MPS6542	AH	0.31	A	20	0	0.1	25	2.0 m	700	1.5		92/29
MPS6543	S	N	MPS6543	AH	0.31	A	25	0		25	4.0 m	750	1.0		92/29
MPS6544	S	N	MPS6544	AH	0.31	A	45	0		20	30 m				/29A
MPS6545	S	N	MPS6544	AH	0.31	A	45	S		20	30 m				/29A
MPS6546	S	N	MPS6546	A	0.31	A	25	0	0.05	20	2.0 m	600			92/29
MPS6547	S	N	MPS6546	A	0.31	A	25	0	0.05	20	2.0 m	600			92/29
MPS6548	S	N	MPS6548	A	0.31	A	25	0		25	4.0 m	650			92/29
MPS6560	S	N	MPS6560	AH	0.5	A	25	0	0.6	50	500 m	60	30		92/29
MPS6561	S	N	MPS6560	AH	0.5	A	20	0	0.6	50	350 m	60	30		92/29
MPS6562	S	P	MPS6560	AH	0.5	A	25	0	0.6	50	500 m	60	30		92/29
MPS6563	S	P	MPS6560	AH	0.5	A	20	0	0.6	50	350 m	60	30		92/29
MPS6565	S	N	MPS6565	AH	0.31	A	45	0	0.2	40	10 m	200	3.5		92/29
MPS6566	S	N	MPS6565	AH	0.31	A	45	0	0.2	100	10 m	200	3.5		92/29
MPS6567	S	N	MPS6567	AH	0.31	A	40	0		25	10 m				92/29
MPS6568	S	N	MPS6568	AH	0.31	A	20	0		20	4.0 m	375			92/29
MPS6568A	S	N	MPS6568	AH	0.31	A	20	0		20	4.0 m	375			92/29
MPS6569	S	N	MPS6568	AH	0.31	A	20	0		20	4.0 m	300			/29A
MPS6570	S	N	MPS6568	AH	0.31	A	20	0		20	4.0 m	300			/29A
MPS6571	S	N	MPS6571	AH	0.31	A	20	0	0.05	250	100*	50	4.5		92/29
MPS6573	S	N	MPS6573	AH	0.31	A	35	0	0.1	200	10 m	200	12		92/29
MPS6574	S	N	MPS6573	AH	0.31	A	35	0	0.1	100	1.0 m	200	12		92/29
MPS6575	S	N	MPS6573	AH	0.31	A	45	0	0.1	200	10 m	200	12		92/29
MPS6576	S	N	MPS6573	AH	0.31	A	45	0	0.1	100	1.0 m	200	12		92/29
MPS6590	S	N	MPS6590	A	0.31	A	80	0	0.25	40	10 m				92/29
MPS6591	S	N	MPS6590	A	0.31	A	50	0	0.25	40	10 m				92/29
MPS8000	S	N	MPS8000	A	0.625	A	60	S	0.5	30	100 m				92/29
MPS8001	S	N	MPS8001	A	0.35	A	25	0	0.1	40	10 m	100			92/29
MPS8098	S	N	MPS8098	A	0.35	A	60	0	0.2	100	1.0 m	150	6.0		92/29
MPS8099	S	N	MPS8098	A	0.35	A	80	0	0.2	100	1.0 m	150	6.0		92/29
MPS8598	S	P	MPS8098	A	0.35	A	60	0	0.2	100	1.0 m	150	8.0		92/29
MPS8599	S	P	MPS8098	A	0.35	A	80	0	0.2	100	1.0 m	150	8.0		92/29
MPS-A05	S	N	MPS-A05	AH	0.5	A	60	0	0.5	50	100 m	50	6.0		92/29
MPS-A06	S	N	MPS-A05	AH	0.3	A	80	0	0.5	50	100 m	50	6.0		92/29
MPS-A09	S	N	MPS-A09	AH	0.3	A	50	0	0.05	100	0.1 m	30	5.0		92/29
MPS-A12	S	N	MPS-A12	AH	0.31	A	20	0	0.3	20k	10 m		8.0		92/29
MPS-A13	S	N	MPS-A13	AH	0.5	A	30	0	0.3	10k	100 m	125	5.0		92/29
MPS-A14	S	N	MPS-A13	AH	0.5	A	30	0	0.3	20k	100 m	125	5.0		92/29
MPS-A16	S	N	MPS-A16	SH	0.35	A	40	0	0.1	200	5.0 m	100	4.0		92/29
MPS-A17	S	N	MPS-A16	SH	0.35	A	40	0	0.1	200	5.0 m	80	4.0		92/29
MPS-A18	S	N	MPS-A18	SH	0.31	A	45	0	0.05	500	10 m	100			92/29
MPS-A20	S	N	MPS-A20	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-A42	S	N	MPS-A42	AH	0.625	A	300	0	0.5	40	30 m	50			92/29
MPS-A43	S	N	MPS-A42	AH	0.625	A	200	0	0.5	50	30 m	50			92/29
MPS-A55	S	P	MPS-A55	A	0.5	A	60	0	0.5	50	100 m	50	6.5		92/29
MPS-A56	S	P	MPS-A56	A	0.5	A	80	0	0.5	50	100 m	50	6.5		92/29
MPS-A65	S	P	MPS-A65	AH	0.5	A	30	0	0.3	20k	100 m	100	2.5*		92/29
MPS-A66	S	P	MPS-A65	AH	0.5	A	30	0	0.3	40k	100 m	100	2.5*		92/29
MPS-A70	S	P	MPS-A70	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-A92	S	P	MPS-A92	AH	0.625	A	300	0	0.5	25	30 m	50			92/29
MPS-A93	S	P	MPS-A92	AH	0.625	A	200	0	0.5	30	30 m	50			92/29
MPS-D01	S	N	MPS-D01	A	0.625	A	200	0	0.1	25	10 m	40			92/29
MPS-D02	S	N	MPS-D02	A	0.35	A	140	0	0.05	25	10 m	40			92/29
MPS-D03	S	N	MPS-D03	A	0.35	A	100	0	0.05	25	10 m	40			92/29
MPS-D04	S	N	MPS-D04	A	0.625	A	25	S	0.3	2000	100 m	100			92/29
MPS-D05	S	N	MPS-D05	A	0.35	A	25	0	0.5	80	100 m	100			92/29
MPS-D06	S	N	MPS-D06	A	0.35	A	25	0	0.05	50	50 m	100			92/29
MPS-D51	S	P	MPS-D01	A	0.625	A	200	0	0.1	25	10 m	40			92/29

TYPE NO.	MATERIAL	POLARITY		REFERENCE	USE	P_D Watts	REF. POINT	V_{CE}- Volts	SUBSCRIPT	I_C Amp Max	h_{FE} Min	@ I_C	f_T MHz Min	C_{ob} pF Max	t_{on} /t_{off} ns Max	PACKAGE TO- No. Case No.
MPS-D52	S	P		MPS-D02	A	0.35	A	140	0	0.05	25	10 m	40			92/29
MPS-D53	S	P		MPS-D03	A	0.35	A	100	0	0.05	25	10 m	40			92/29
MPS-D54	S	P		MPS-D04	A	0.625	A	25	S	0.3	2000	100 m	100			92/29
MPS-D55	S	P		MPS-D05	A	0.35	A	25	0	0.5	80	100 m	100			92/29
MPS-D56	S	P		MPS-D06	A	0.35	A	25	0	0.05	50	50 m	100			92/29
MPS-H02	S	N		MPS-H02	AH	0.5	A	20	0		20	4.0 m	375			92/29
MPS-H04	S	N		MPS-H04	AH	0.3	A	80	0	0.1	30	1.5 m	80			92/29
MPS-H05	S	N		MPS-H05	AH	0.3	A	80	0	0.1	30	1.5 m	80			92/29
MPS-H07	S	N		MPS-H07	AH	0.31	A	30	0		20	3.0 m	400			92/29
MPS-H08	S	N		MPS-H07	AH	0.31	A	30	0		20	3.0 m	500			92/29
MPS-H10	S	N		MPS-H10	AH	0.35	A	25	0		60	4.0 m	650			92/29
MPS-H11	S	N		MPS-H10	AH	0.35	A	25	0		60	4.0 m	650			92/29
MPS-H17	S	N		MPS-H17	A	0.625	A	15	0		25	5.0 m	800			92/29
MPS-H19	S	N		MPS-H19	AH	0.35	A	25	0		45	4.0 m	300			92/29
MPS-H20	S	N		MPS-H20	AH	0.625	A	30	0	0.1	25	4.0 m	400			92/29
MPS-H24	S	N		MPS-H24	AH	0.5	A	30	0	0.1	30	8.0 m	400			92/29
MPS-H30	S	N		MPS-H30	AH	0.31	A	20	0		20	4.0 m	300			92/29
MPS-H31	S	N		MPS-H30	AH	0.31	A	20	0		20	4.0 m	300			92/29
MPS-H32	S	N		MPS-H32	AH	0.31	A	40	0		27	4.0 m	300			92/29
MPS-H34	S	N		MPS-H34	AH	0.5	A	45	0	0.1	15	20 m	500			92/29
MPS-H37	S	N		MPS-H37	AH	0.31	A	40	0		25	5.0 m	300			92/29
MPS-H54	S	P		MPS-H54	AH	0.3	A	80	0	0.1	30	1.5 m	80			92/29
MPS-H55	S	P		MPS-H54	AH	0.3	A	80	0	0.1	30	1.5 m	80			92/29
MPS-H81	S	P		MPS-H81	AH	0.35	A	20	0		60	5.0 m	600			92/29
MPS-H83	S	P		MPS-H83	AH	1.0	A	300	0		40	30 m	60			/29A
MPS-H85	S	P		MPS-H85	A	0.31	A	30	0		20	2.5 m	350			/29A
MPS-K20	S	N		MPS-A20	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-K21	S	N		MPS-A20	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-K22	S	N		MPS-A20	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-K70	S	P		MPS-A70	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-K71	S	P		MPS-A70	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-K72	S	P		MPS-A70	AH	0.3	A	40	0	0.1	40	5.0 m	125	4.0		92/29
MPS-L01	S	N		MPS-L01	AH	0.31	A	120	0	0.6	50	10 m	60	8.0		92/29
MPS-L51	S	P		MPS-L51	AH	0.31	A	100	0	0.6	40	50 m	60	8.0		92/29
MPS-M83	S	P		MPS-M83	AH	0.35	A	30	0		20	25 m	600			/262
MPS-U01	S	N		MPS-U01	AH	1.0	A	30	0	2.0	50	1.0 A	50	20		/152
MPS-U01A	S	N		MPS-U01	AH	1.0	A	40	0	2.0	50	1.0 A	50	30		/152
MPS-U02	S	N		MPS-U02	AH	1.0	A	40	0	0.8	50	150 m	150	8.0		/152
MPS-U03	S	N		MPS-U03	AH	1.0	A	120	0	1.0	40	10 m	100	12		/152
MPS-U04	S	N		MPS-U03	AH	1.0	A	180	0	1.0	40	10 m	100	12		/152
MPS-U05	S	N		MPS-U05	AH	1.0	A	60	0	2.0	60	250 m	50	12		/152
MPS-U06	S	N		MPS-U05	AH	1.0	A	80	0	2.0	60	250 m	50	12		/152
MPS-U07	S	N		MPS-U07	AH	1.0	A	100	0	2.0	30	250 m	50	12		/152
MPS-U10	S	N		MPS-U10	AH	1.0	A	300	0	0.5	40	10 m	60	3.0		/152
MPS-U31	S	N		MPS-U31	AH	1.0	A	65	S	0.5	10	100 m		40		/152
MPS-U45	S	N		MPS-U45	AH	1.0	A	40	0	2.0	25k	200 m	100			/152
MPS-U51	S	P		MPS-U51	AH	1.0	A	30	0	2.0	50	1.0 A	50	30		/152
MPS-U51A	S	P		MPS-U51	AH	1.0	A	40	0	2.0	50	1.0 A	50	30		/152
MPS-U52	S	P		MPS-U52	AH	1.0	A	40	0	0.8	50	150 m	150	24		/152
MPS-U55	S	P		MPS-U55	AH	1.0	A	60	0	2.0	50	250 m	50	15		/152
MPS-U56	S	P		MPS-U55	AH	1.0	A	80	0	2.0	50	250 m	50	15		/152
MPS-U57	S	P		MPS-U57	AH	1.0	A	100	0	2.0	30	5.0 m	50	15		/152
MPS-U60	S	P		MPS-U60	AH	1.0	A	300	0	0.5	25	1.0 m	60	60		/152
MPS-U95	S	P		MPS-U95	AH	1.0	A	40	0	2.0	4000	1.0 A	320*			/152
MQ982	S	P		MD982	AM	0.4	A	50	0	0.6	40	150 m	200	8.0		/607
MQ1120	S	P		MD1120	AM	0.4	A	30	0	0.5	50	10 m	200	8.0		/607
MQ1129	S	N		MD1129	AM	0.4	A	30	0	0.5	100	10 m	200	8.0		/607
MQ2218	S	N		MD2218	ASM	0.4	A	30	0	0.5	40	150 m	200	8.0		/607
MQ2218A	S	N		MD2218	ASM	0.4	A	30	0	0.5	40	150 m	200	8.0		/607
MQ2219	S	N		MD2218	ASM	0.4	A	30	0	0.5	100	150 m	200	8.0		/607
MQ2219A	S	N		MD221	ASM	0.4	A	30	0	0.5	100	150 m	200	8.0		/607
MQ2904	S	P		MD2904	ASM	0.4	A	40	0	0.6	40	150 m	200	8.0	45/130	/607
MQ2905A	S	P		MD2904	ASM	0.4	A	60	0	0.6	100	150 m	200	8.0	45/130	/607
MQ3467	S	P		MD3467	SM	0.4	A	40	0	1.0	20	500 m	150		40/110	/607
MQ3725	S	N		MD3725	ASM	0.4	A	40	0	1.0	50	100 m	250	10	45/75	/607
MQ3762	S	P		MD3762	SM	0.5	A	40	0	1.5	20	1.0 A	150		40/110	/607
MQ3799	S	P		MQ3799	AM	0.25	A	60	0	0.05	300	1.0 m	100	4.0		/607
MQ7001	S	P		MD7001	S	0.4	A	30	0	0.6	70	150 m	200	8.0		/607
MRF207	S	N		MRF207	AH	3.5	C	18	0	0.4	5.0	100 m				39/79
MRF208	S	N		MRF207	AHP	37.5	C	18	0	2.0	5.0	250 m				/145A

TYPE NO.	MATERIAL	POLARITY		REFERENCE	USE	P_D Watts	REF. POINT	V_{CE-} Volts	SUBSCRIPT	I_C Amp Max	h_{FE} @ I_C		f_T MHz Min	C_{ob} pF Max	t_{on} / t_{off} ns Max	PACKAGE	
											Min					TO- No.	Case No.
MRF209	S	N		MRF207	AHP	50	C	18	0	4.0	5.0	500 m					145A
MRF215	S	N		MRF215	AHP	31	C	18	0	2.5	5.0	500 m		85			278-04
MRF216	S	N		MRF216	AHP	75	C	18	0	6.0	5.0	1.0 A		200			278-04
MRF304	S	N		MRF304	AHP	30	C	33	0	2.0	10	500 m		25			278-03
MRF305	S	N		MRF305	AHP	70	C	33	0		10	500 m		45			278-03
MRF401	S	N		MRF401	AHP	50	C	30	0	3.3	10	1.0 A		85			145A-01
MRF501	S	N		MRF501	AH	0.2	A	15	0	0.05	30	1.0 m	1000			72	20
MRF502	S	N		MRF501	AH	0.2	A	15	0	0.05	40	1.0 m	1200			72	20
MRF509	S	N		MRF509	AH	2.0	C	30	0	0.4	30	50 m	500	3.0			207A-01
MRF603	S	N		MRF603	AHP	30	C	18	0	2.0	5.0	500 m		85			145A-01
MRF607	S	N		MRF607	AH	3.5*	C	16	0	0.33	20	50 A		15		39	79
MRF618	S	N		MRF618	AHP	45	C	18	0	2.5	30	1.0 A		80			278
MRF619	S	N		MRF619	AHP	115	C	16	0	6.0	30	4.0 A		95			278
MRF620	S	N		MRF619	AHP	115	C	16	0	8.0	30	4.0 A		95			278
MRF5177	S	N		MRF5177	AHP	58	C	35	0	4.0	10	100 m		50			215
MRF8004	S	N		MRF8004	AH	5.0	C	30	0	1.0	10	400 m		70		39	79

TABLE 29 - HYPER-ABRUPT JUNCTION TUNING DIODES INDEX
TABLE 30 - MICRO-I EPICAP DIODES INDEX
TABLE 31 - MINI-L ABRUPT JUNCTION TUNING DIODES INDEX
TABLE 32 - VOLTAGE-VARIABLE CAPACITANCE DIODES INDEX

The following tables contain an alpha-numerical listing and short-form specifications for Motorola in-house non-registered hyper-abrupt junction tuning diodes, Micro-I Epicap diodes, Mini-L abrupt junction tuning diodes and voltage-variable capacitance diodes.

KEY

TYPE		REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BVR	Q @ f		PD @ 25°C
			C_T Nom pF	C Tol %	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	V_2 Volts	BV_R Volts	Q	@ f MHz	P_D @ 25°C Watts
Alpha-numerical Listing											

First type number on data sheet where the part number is located

Nominal Total Capacitance

Tolerance of capacitance listed in preceding column

Capacitance Ratio (Capacitance at Voltage V_1 divided by capacitance at Voltage V_2)

Test voltages for capacitance ratio

Reverse Breakdown Voltage

Figure of Merit at specified frequency

Power Dissipation at 25°C

HYPER-ABRUPT JUNCTION TUNING DIODES INDEX

TYPE		REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BVR	Q @ f		PD @ 25°C
			C_T Nom pF	C Tol ±%	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	V_2 Volts	BV_R Volts	Q	@ f MHz	P_D @ 25°C Watts
BB105A		BB105A	2.6	10	4.0	3.0	25	30	225	100	0.4
BB105B		BB105A	2.2	7	4.5	3.0	25	30	225	100	0.4
BB105G		BB105A	2.3	22	4.0	3.0	25	30	150	100	0.4
MV1401		MV1401	550	15	14	1.0	10	12	200	13	0.4
MV1403		MV1401	175	20	10	2.0	10	12	200	13	0.4
MV1404		MV1401	120	10	10	2.0	10	12	200	13	0.4
MV1405		MV1401	250	20	10	2.0	10	12	200	13	0.4
MV3102		MV3102	22	11	4.5	3.0	25	30	300	50	0.4
MV3103		MV3102	22	16	4.0	3.0	25	30	200	50	0.4
MV3140		MV3140	2.3*		4.5	3.0	25	30	150	100	0.4
MV3141		MV3140	3.2*		4.0	3.0	25	30	150	100	0.4
MV3142		MV3140	3.2*		3.5	3.0	25	30	50	100	0.4

MICRO-I EPICAP DIODES INDEX

TYPE		REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV$_R$	Q @ f		P$_D$ @ 25°C
			C$_T$ Nom pF	C Tol ±%	$\frac{C1}{C2}$ Min	Test Voltages V$_1$ Volts	V$_2$ Volts	Volts	Q	MHz	Watts
MVI-2097		MVI-2907	1.0	10	2.0	2.0	30	30	325	100	0.28
MVI-2098		MVI-2907	2.2	10	2.0	2.0	30	30	325	100	0.28
MVI-2099		MVI-2907	3.3	10	2.2	2.0	30	30	300	100	0.28
MVI-2100		MVI-2907	4.7	10	2.4	2.0	30	30	300	100	0.28
MVI-2101		MVI-2907	6.8	10	2.5	2.0	30	30	275	100	0.28
MVI-2102		MVI-2907	8.2	10	2.6	2.0	30	30	275	100	0.28
MVI-2103		MVI-2907	10	10	2.6	2.0	30	30	275	100	0.28
MVI-2104		MVI-2907	12	10	2.6	2.0	30	30	275	100	0.28
MVI-2105		MVI-2907	15	10	2.6	2.0	30	30	275	100	0.28
MVI-2106		MVI-2907	18	10	2.7	2.0	30	30	250	100	0.28
MVI-2107		MVI-2907	22	10	2.7	2.0	30	30	200	100	0.28
MVI-2108		MVI-2907	27	10	2.7	2.0	30	30	200	100	0.28
MVI-2109		MVI-2907	33	10	2.7	2.0	30	30	200	100	0.28

MINI-L ABRUPT JUNCTION TUNING DIODES INDEX

TYPE		REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV$_R$	Q @ f		P$_D$ @ 25°C
			C$_T$ Nom pF	C Tol ±%	$\frac{C1}{C2}$ Min	Test Voltages V$_1$ Volts	V$_2$ Volts	Volts	Q	MHz	Watts
MV3501		MV3501	6.8	10	2.7	2.0	30	30	225	100	0.4
MV3502		MV3501	8.2	10	2.8	2.0	30	30	225	100	0.4
MV3503		MV3501	10	10	2.8	2.0	30	30	200	100	0.4
MV3504		MV3501	12	10	2.8	2.0	30	30	200	100	0.4
MV3505		MV3501	15	10	2.9	2.0	30	30	200	100	0.4
MV3506		MV3501	18	10	2.9	2.0	30	30	175	100	0.4
MV3507		MV3501	22	10	2.9	2.0	30	30	175	100	0.4

VOLTAGE-VARIABLE CAPACITANCE DIODES INDEX

TYPE		REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol ±%	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	Test Voltages V_2 Volts	Volts	Q	MHz	Watts
MV104		MV104	40	6	2.5	3.0	30	32	100	100	
MV109		MV109	29	10	5.0	3.0	25	30	280	50	0.4
MV209		MV209	29		5.0	3.0	25	30	200	50	0.28
MV830		MV830	15	10	1.8	4.0	25	30	30	50	0.4
MV831		MV830	18	10	1.8	4.0	25	30	25	50	0.4
MV832		MV830	22	10	1.8	4.0	25	30	25	50	0.4
MV833		MV830	27	10	1.8	4.0	25	30	25	50	0.4
MV834		MV830	33	10	1.9	4.0	25	30	20	50	0.4
MV835		MV830	39	10	1.9	4.0	25	30	20	50	0.4
MV836		MV830	47	10	1.9	4.0	25	30	15	50	0.4
MV837		MV830	56	10	1.9	4.0	25	30	15	50	0.4
MV838		MV830	68	10	2.0	4.0	25	30	15	50	0.4
MV839		MV830	82	10	2.0	4.0	25	30	10	50	0.4
MV840		MV830	100	10	2.0	4.0	25	30	10	50	0.4
MV1620		MV1620	68	10	2.0	2.0	20	20	300	50	2.0
MV1622		MV1620	82	10	2.0	2.0	20	20	300	50	2.0
MV1624		MV1620	10	10	2.0	2.0	20	20	300	50	2.0
MV1626		MV1620	12	10	2.0	2.0	20	20	300	50	2.0
MV1628		MV1620	15	10	2.0	2.0	20	20	250	50	2.0
MV1630		MV1620	18	10	2.0	2.0	20	20	250	50	2.0
MV1632		MV1620	20	10	2.0	2.0	20	20	250	50	2.0
MV1634		MV1620	22	10	2.0	2.0	20	20	250	50	2.0
MV1636		MV1620	27	10	2.0	2.0	20	20	200	50	2.0
MV1638		MV1620	33	10	2.0	2.0	20	20	200	50	2.0
MV1640		MV1620	39	10	2.0	2.0	20	20	200	50	2.0
MV1642		MV1620	47	10	2.0	2.0	20	20	200	50	2.0
MV1644		MV1620	56	10	2.0	2.0	20	20	150	50	2.0
MV1646		MV1620	68	10	2.0	2.0	20	20	150	50	2.0
MV1648		MV1620	82	10	2.0	2.0	20	20	150	50	2.0
MV1650		MV1620	100	10	2.0	2.0	20	20	150	50	2.0
MV1652		MV1652	120	10	2.6*	2.0	20	20	350	20	0.4
MV1654		MV1652	150	10	2.6*	2.0	20	20	250	20	0.4
MV1656		MV1652	180	10	2.6*	2.0	20	20	200	20	0.4
MV1658		MV1652	200	10	2.6*	2.0	20	20	200	20	0.4
MV1660		MV1652	220	10	2.6*	2.0	20	20	150	20	0.4
MV1662		MV1652	250	10	2.3*	2.0	15	15	150	20	0.4
MV1664		MV1652	270	10	2.3*	2.0	15	15	100	20	0.4
MV1666		MV1652	330	10	2.3*	2.0	15	15	100	20	0.4
MV1858D		MV1858D	1.0	30	2.1	4.0	60	60	350	100	5.0
MV1860D		MV1858D	2.2	20	2.5	4.0	60	60	350	100	5.0
MV1862D		MV1858D	3.3	10	2.6	4.0	60	60	300	100	5.0
MV1863D		MV1858D	4.7	10	2.6	4.0	60	60	300	100	5.0
MV1864D		MV1858D	6.8	10	2.7	4.0	60	60	300	100	5.0
MV1865D		MV1858D	8.2	10	2.7	4.0	60	60	300	100	5.0
MV1866		MV1866	10	10	3.0	4.0	60	60	700	50	2.0
MV1866D		MV1858D	10	10	2.8	4.0	60	60	250	100	5.0
MV1868		MV1866	12	10	3.0	4.0	60	60	700	50	2.0
MV1868D		MV1858D	12	10	2.8	4.0	60	60	200	100	5.0
MV1870		MV1866	15	10	3.0	4.0	60	60	700	50	2.0
MV1870D		MV1858D	15	10	2.8	4.0	60	60	200	100	5.0
MV1871		MV1866	18	10	3.0	4.0	60	60	700	50	2.0
MV1872		MV1866	22	10	3.2	4.0	60	60	700	50	2.0
MV1874		MV1866	27	10	3.2	4.0	60	60	700	50	2.0
MV1876		MV1866	33	10	3.2	4.0	60	60	700	50	2.0
MV1877		MV1866	39	10	3.2	4.0	60	60	700	50	2.0
MV1878		MV1866	47	10	3.2	4.0	60	60	700	50	2.0
MV2101		MV2101	68	10	2.5	2.0	30	30	450	50	0.28
MV2102		MV2101	82	10	2.5	2.0	30	30	450	50	0.28
MV2103		MV2101	10	10	2.5	2.0	30	30	400	50	0.28
MV2104		MV2101	12	10	2.5	2.0	30	30	400	50	0.28
MV2105		MV2101	15	10	2.5	2.0	30	30	400	50	0.28
MV2106		MV2101	18	10	2.5	2.0	30	30	350	50	0.28
MV2107		MV2101	22	10	2.5	2.0	30	30	350	50	0.28
MV2108		MV2101	27	10	2.5	2.0	30	30	300	50	0.28
MV2109		MV2101	33	10	2.5	2.0	30	30	200	50	0.28

VOLTAGE-VARIABLE CAPACITANCE DIODES INDEX

MV2110-MV2308

TYPE		REFERENCE	CAPACITANCE		CAPACITANCE RATIO			BV_R	Q @ f		P_D @ 25°C
			C_T Nom pF	C Tol ±%	$\frac{C1}{C2}$ Min	Test Voltages V_1 Volts	Test Voltages V_2 Volts	Volts		MHz	Watts
MV2110		MV2101	39	10	2.5	2.0	30	30	150	50	0.28
MV2111		MV2101	47	10	2.5	2.0	30	30	150	50	0.28
MV2112		MV2101	56	10	2.5	2.0	30	30	150	50	0.28
MV2113		MV2101	68	10	2.6	2.0	30	30	150	50	0.28
MV2114		MV2101	82	10	2.6	2.0	30	30	100	50	0.28
MV2115		MV2101	100	10	2.6	2.0	30	30	100	50	0.28
MV2201		MV2201	6.8	18	1.9	1.0	10	25	300	50	0.28
MV2203		MV2201	10	15	2.0	1.0	10	25	200	50	0.28
MV2205		MV2201	15	13	2.1	1.0	10	25	200	50	0.28
MV2209		MV2201	33	12	2.1	1.0	10	25	150	50	0.28
MV2301		MV2301	120	10	2.3	2.0	20	20	250	20	0.5
MV2302		MV2301	150	10	2.3	2.0	20	20	250	20	0.5
MV2303		MV2301	180	10	2.3	2.0	20	20	200	20	0.5
MV2304		MV2301	200	10	2.3	2.0	20	20	200	20	0.5
MV2305		MV2301	220	10	2.3	2.0	20	20	150	20	0.5
MV2306		MV2301	250	10	2.3	2.0	20	20	150	20	0.5
MV2307		MV2301	270	10	2.3	2.0	20	20	100	20	0.5
MV2308		MV2301	330	10	2.3	2.0	20	20	100	20	0.5

TABLE 33 - POWER VARACTOR MULTIPLIERS INDEX

This table contains an alpha-numerical listing and short-form specifications for Motorola in-house non-registered power varactor multipliers.

KEY

TYPE	REF.	C_J C_T* pF	BV_R Volts	Q @ f GHz	P_D @ 25°C Watts

Alpha-numerical Listing

First type number on data sheet where the part number is located

Nominal Capacitance usually C_J (junction capacitance)
With *, specified value is C_r (total capacitance)
$C_r = C_J + C_C$

Reverse Breakdown Voltage

Figure of Merit at this specified frequency

Power Dissipation at 25°C

POWER VARACTOR MULTIPLIERS INDEX

TYPE	REF.	C_J C_T* pF	BV_R Volts	Q	@ f GHz	P_D @ 25°C Watts
MV1804	1N4387	35	150	150	0.05	20
MV1805C	MV805C	30*	80			18
MV1806	1N4388	20*	100	200	0.05	10
MV1806C	1N5149	11.5*	80	800	0.05	10
MV1807C	1N5149	11.5*	80	800	0.05	14
MV1809C	MV1809C	14.4*	75			9.0
MV1809C1	MV1809C	13.2*	75			14
MV1810A	1N5154	2.1*	35	1700	0.05	3.5
MV1810B	1N5155	2.1*	35	1700	0.05	3.5
MV1812A	1N5156	1.0*	20	3600	0.05	3.25
MV1812B	1N5157	0.6*	20	3600	0.05	3.25
MV1816A	MV1816B	3.7*	75			7.5
MV1816A1	MV1816B	3.4*	75			11.5
MV1816B	MV1816B	3.6*	75			7.5
MV1816B1	MV1816B	3.3*	75			11.5
MV1817A	MV1817B	1.3*	35			5.0
MV1817A1	MV1817B	1.2*	35			7.0
MV1817B	MV1817B	1.2*	35			5.0
MV1817B1	MV1817B	1.1*	35			7.0

TABLE 34 - SILICON POWER VOLTAGE REGULATOR INDEX

The following table contains an alpha-numerical listing and short-form specification for Motorola in-house non-registered silicon power voltage regulators.

KEY

TYPE	REF.	V_O Volts		$\lvert V_{in} - V_O \rvert$ Volts		V_{in} Volts		I_{IB} mA	Reg_{in} $\%V_O/V_{in}$	Reg_L $\%V_O$	P_D Watts
		Min	Max	Min	Max	Min	Max	Max	Max	Max	Max

Alpha-numerical Listing

First type number on data sheet where the part number is located

Output Voltage Range

Input-Output Voltage Differential

Input Voltage Range

Internal Power Dissipation

Load Regulation

Line Regulation

Standby Current Drain

SILICON POWER VOLTAGE REGULATOR INDEX

TYPE	REF.	V_O Volts		$\lvert V_{in} - V_O \rvert$ Volts		V_{in} Volts		I_{IB} mA	Reg_{in} $\%V_O/V_{in}$	Reg_L $\%V_O$	P_D Watts
		Min	Max	Min	Max	Min	Max	Max	Max	Max	Max
MPC1000	MPC1000	2.0	35	3.0	60	9.5	40	50	0.5	0.6	100

NOTES

NOTES

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DEVICES FOR MILITARY APPLICATIONS

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2N. . . Device Numbers Page 4-5
- THYRISTORS
- TRANSISTORS
  - Field-Effect
  - High Frequency
  - Milliwatt
  - Multiple Device
  - Power
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  - Switching
  - Unijunction

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- MIL-M-38510 PROGRAM
- MTTL
- MDTL
- McMOS
- MECL 10,000
- LINEAR
- MEMORIES

DEVICES FOR MILITARY APPLICATIONS

1N. . .Device Numbers
ASSEMBLIES
DIODES
Reference
Zener
RECTIFIERS

The following tables list devices that appear in QPL-19500 (Qualified Products List) as of 31 July 1973 and are available in the JAN, JANTX, and JANTXV versions as specified. Check with your local Motorola sales office or franchised distributor for current qualification status and availability.

SILICON ZENER DIODES ±5% SERIES

MIL-S-19500/127

1N746A JAN,JTX,JTXV thru
  1N759A JAN,JTX,JTXV.

MIL-S-19500/117

1N962B JAN,JTX,JTXV thru
  1N992B JAN,JTX,JTXV.

***MIL-S-19500/114**

1N2804B JAN,JTX thru
  1N2811B JAN,JTX
1N2813B JAN,JTX
1N2814B JAN,JTX
1N2816B JAN,JTX
1N2818B JAN,JTX thru
  1N2820B JAN,JTX
1N2822B JAN,JTX thru
  1N2827B JAN,JTX
1N2829B JAN,JTX
1N2831B JAN,JTX thru
  1N2838B JAN,JTX
1N2840B JAN,JTX thru.
  1N2846 JAN,JTX.

***MIL-S-19500/124**

1N2970B JAN,JTX thru
  1N2977B JAN,JTX
1N2979B JAN,JTX
1N2980B JAN,JTX
1N2982B JAN,JTX
1N2984B JAN,JTX thru
  1N2986B JAN,JTX
1N2988B JAN,JTX thru
  1N2993B JAN,JTX
1N2995B JAN,JTX
1N2997B JAN,JTX
1N2999B JAN,JTX thru
  1N3005B JAN,JTX
1N3007B JAN,JTX thru.
  1N3009B JAN,JTX
1N3011B JAN,JTX
1N3012B JAN,JTX
1N3014B JAN,JTX
1N3015B JAN,JTX

MIL-S-19500/115

1N3016B JAN,JTX,JTXV thru
  1N3051B JAN,JTX,JTXV

***MIL-S-19500/358**

1N3305B JAN,JTX thru
  1N3312B JAN,JTX
1N3314B JAN,JTX
1N3315B JAN,JTX
1N3317B JAN,JTX
1N3319B JAN,JTX thru
  1N3312B JAN,JTX
1N3323B JAN,JTX thru
  1N3328B JAN,JTX
1N3330B JAN,JTX
1N3332B JAN,JTX
1N3334B JAN,JTX thru
  1N3340B JAN,JTX
1N3342B JAN,JTX thru
  1N3344B JAN,JTX
1N3346B JAN,JTX
1N3347B JAN,JTX
1N3349B JAN,JTX
1N3350B JAN,JTX

SILICON ZENER DIODES ±5% SERIES (Cont.)

MIL-S-19500/115

1N3821A JAN,JTX,JTXV thru
  1N3828A JAN,JTX,JTXV

****MIL-S-19500/272**

1N3993A JAN,JTX thru
  1N4000A JAN,JTX

MIL-S-19500/435

1N4099 JAN,JTX,JTXV thru
  1N4135 JAN,JTX,JTXV.

MIL-S-19500/127

1N4370A JAN,JTX,JTXV thru
  1N4372A JAN,JTX,JTXV

***MIL-S-19500/358**

1N4549B JAN,JTX thru
  1N4554B JAN,JTX

MIL-S-19500/435

1N4614 JAN,JTX,JTXV thru
  1N4627 JAN,JTX,JTXV.

*Reverse Polarities (Suffix RB) are available.
**Reverse Polarities (Suffix RA) are available.

DEVICES FOR MILITARY APPLICATIONS (continued)

1N. . .DEVICE NUMBERS (continued)

TC REFERENCE DIODES

MIL-S-19500	
1N429 JAN	/299
1N821 JAN,JTX,JTXV	/159
1N823 JAN,JTX,JTXV	/159
1N825 JAN,JTX,JTXV	/159
1N827 JAN,JTX,JTXV	/159
1N829 JAN,JTX,JTXV	/159
1N935B JAN,JTX,JTXV	/156
1N937B JAN,JTX,JTXV	/156
1N938B JAN,JTX,JTXV	/156
1N939B JAN,JTX,JTXV	/156
1N941B JAN,JTX	/157
1N943B JAN,JTX	/157
1N944B JAN,JTX	/157
1N945B JAN,JTX	/157
1N3154 JAN,JTX	/158
1N3155 JAN,JTX	/158
1N3156 JAN,JTX	/158
1N3157 JAN,JTX	/158

RECTIFIERS

MIL-S-19500/304

1N3890 JAN,JTX,JTXV . . . .
1N3890R JAN,JTX,JTXV . . . .
1N3891 JAN,JTX,JTXV . . . .
1N3891R JAN,JTX,JTXV . . . .
1N3893 JAN,JTX,JTXV . . . .
1N3893R JAN,JTX,JTXV . . . .

DIODE ASSEMBLIES

MIL-S-19500	
1N1530A JAN	/320
1N1742A JAN	/298

The following table lists devices which are in the process of qualification for listing in QPL-19500 as of 31 July 1973. Check with your local Motorola sales office or franchised distributor for current qualification status and availability.

RECTIFIERS

MIL-S-19500/308

1N3910,11,12,13 JAN,JTX . . . .

DEVICES FOR MILITARY APPLICATIONS (continued)

2N. . . Device Numbers
TRANSISTORS
Field Effect, High Frequency, Milliwatt, Multiple Device, Power, RF Power, Switching and Unijunction
THYRISTORS

The following tables list devices that appear in QPL-19500 (Qualified Products List) as of 31 July 1973 and are available in the JAN, JANTX, and JANTXV versions as specified. Check with your local Motorola sales office or franchised distributor for current qualification status and availability.

SWITCHING AND HIGH FREQUENCY TRANSISTORS

MIL-S-19500	
2N393 JAN	/77
2N499 JAN	/72
2N499A JAN	/72
2N501A JAN	/62
2N502A JAN	/112
2N502B JAN	/112
2N559 JAN,JTX	/152
2N703 JAN	/153
2N705 JAN	/86
2N706 JAN	/120
2N708 JAN,JTX	/312
2N718A JAN,JTX,JTXV	/181
2N869A JAN,JTX	/283
2N914 JAN,JTX	/373
2N916 JAN	/271
2N929 JAN,JTX	/253
2N930 JAN,JTX	/253
2N962 JAN	/258
2N964 JAN	/258
2N1131 JAN	/177
2N1132 JAN	/177
2N1613 JAN,JTX	/181
2N2218 JAN,JTX,JTXV	/251
2N2218A JAN,JTX,JTXV	/251
2N2219 JAN,JTX,JTXV	/251
2N2219A JAN,JTX,JTXV	/251
2N2221 JAN,JTX,JTXV	/255
2N2221A JAN,JTX,JTXV	/255
2N2222 JAN,JTX,JTXV	/255
2N2222A JAN,JTX,JTXV	/255
2N2369A JAN,JTX,JTXV	/317
2N2481 JAN,JTX	/268
2N2857 JAN,JTX,JTXV	/343
2N2904 JAN,JTX,JTXV	/290
2N2904A JAN,JTX,JTXV	/290
2N2905 JAN,JTX,JTXV	/290
2N2905A JAN,JTX,JTXV	/290
2N2906 JAN,JTX,JTXV	/291
2N2906A JAN,JTX,JTXV	/291
2N2907 JAN,JTX,JTXV	/291
2N2907A JAN,JTX,JTXV	/291
2N3013 JAN,JTX	/287
2N3250A JAN,JTX,JTXV	/323
2N3251A JAN,JTX,JTXV	/323
2N3253 JAN	/347
2N3444 JAN	/347
2N3449 JAN	/338
2N3467 JAN,JTX,JTXV	/348
2N3468 JAN,JTX,JTXV	/348
2N3485A JAN,JTX	/392
2N3486A JAN,JTX	/392
2N3498 JAN,JTX,JTXV	/366
2N3499 JAN,JTX,JTXV	/366
2N3500 JAN,JTX,JTXV	/366
2N3501 JAN,JTX,JTXV	/366
2N3506 JAN,JTX,JTXV	/349
2N3507 JAN,JTX,JTXV	/349
2N3634 JAN,JTX,JTXV	/357
2N3635 JAN,JTX,JTXV	/357
2N3636 JAN,JTX,JTXV	/357
2N3637 JAN,JTX,JTXV	/357
2N3743 JAN,JTX,JTXV	/397
2N3763 JAN,JTX	/396
2N3765 JAN,JTX	/396
2N3959 JAN,JTX	/399
2N3960 JAN,JTX	/399
2N4449 JAN,JTX,JTXV	/317
2N4453 JAN,JTX	/283
2N4930 JAN,JTX,JTXV	/397
2N4931 JAN,JTX,JTXV	/397
2N4957 JAN,JTX	/426
2N5581 JAN,JTX	/423
2N5582 JAN,JTX	/423

POWER TRANSISTORS

MIL-S-19500	
2N297A JAN	/36
2N665 JAN	/58
2N1120 JAN	/68
2N1165 JAN	/178
2N1358 JAN	/122
2N1549A JAN	/332
2N1550A JAN	/332
2N1551A JAN	/332
2N1552A JAN	/332
2N1560A JAN.	/330
2N1651 JAN	/219
2N1652 JAN	/219
2N1653 JAN	/219
2N2079A JAN.	/340
2N2528 JAN	/309
2N3055 JAN,JTX.	/407
2N3715 JAN,JTX.	/408
2N3716 JAN,JTX.	/408
2N3739 JAN,JTX.	/402
2N3740 JAN,JTX.	/441
2N3741 JAN,JTX.	/441
2N3791 JAN,JTX.	/379
2N3792 JAN,JTX	/379
2N3867 JAN,JTX,JTXV	/350
2N3868 JAN,JTX,JTXV	/350
2N3902 JAN,JTX	/371
2N4399 JAN,JTX	/433
2N5302 JAN,JTX	/456
2N5303 JAN,JTX	/456
2N5685 JAN,JTX	/464
2N5686 JAN,JTX	/464
2N5745 JAN,JTX	/433

DEVICES FOR MILITARY APPLICATIONS (continued)

SILICON CONTROLLED RECTIFIERS

MIL-S-19500	
2N4199 JAN	/372
2N4200 JAN	/372
2N4201 JAN	/372
2N4202 JAN	/372
2N4203 JAN	/372
2N4204 JAN	/372

RF POWER TRANSISTORS

MIL-S-19500	
2N700A JAN	/123
2N918 JAN,JTX,JTXV	/301
2N1142 JAN	/87
2N1195 JAN	/71
2N2273 JAN	/244
2N2708 JAN	/302
2N3127 JAN	/346
2N3375 JAN,JTX,JTXV	/341
2N3553 JAN,JTX,JTXV	/341
2N3866 JAN,JTX,JTXV	/398
2N3866A JAN,JTX,JTXV	/398

FIELD-EFFECT TRANSISTORS

MIL-S-19500	
2N3330 JAN,JTX	/378
2N3821 JAN,JTX,JTXV	/375
2N3822 JAN,JTX,JTXV	/375
2N3823 JAN,JTX,JTXV	/375

MULTIPLE DEVICES

MIL-S-19500	
2N2060 JAN,JTX,JTXV	/270
2N2639 JAN,JTX,JTXV	/316
2N2642 JAN,JTX,JTXV	/316
2N2919 JAN,JTX,JTXV	/355
2N2920 JAN,JTX,JTXV	/355
2N3810 JAN,JTX,JTXV	/336
2N3811 JAN,JTX,JTXV	/336
2N3838 JAN,JTX,JTXV	/421
2N4854 JAN,JTX,JTXV	/421

MILLIWATT TRANSISTORS

MIL-S-19500	
2N398A JAN	/174
2N404 JAN	/20
2N404A JAN	/20
2N461 JAN	/45
2N464 JAN	/49
2N465 JAN	/49
2N467 JAN	/49
2N526 JAN	/60
2N650A JAN	/175
2N651A JAN	/175
2N652A JAN	/175
2N1008B JAN	/196

UNIJUNCTION

MIL-S-19500	
2N4948 JAN,JTX	/388
2N4949 JAN,JTX	/388
2N5431 JAN,JTX	/425

The following tables list devices which are in the process of qualification for listing in QPL-19500 as of 31 July 1973. Check with your local Motorola sales office or franchised distributor for current qualification status and availability.

SWITCHING AND HIGH FREQUENCY TRANSISTORS

MIL-S-19500	
2N4405 JAN,JTX	/448
2N6365 JAN	/471
2N6365A JAN	/471

POWER TRANSISTORS

MIL-S-19500	
2N3439,40 JAN,JTX	/368
2N3584,85 JAN,JTX	/384
2N5683,84 JAN,JTX	/466

FIELD-EFFECT TRANSISTORS

MIL-S-19500	
2N4092 JAN,JTX	/431
2N4093 JAN,JTX	/431

MOTOROLA MIL-M-38510 PROGRAM

— the ultimate in quality assurance for integrated circuits

Motorola is the industry's pioneer manufacturer of high-reliability integrated circuits, having been the first company to be qualified as a MIL-M-38510 approved facility by the Defense Electronics Supply Center of the Department of Defense early in 1971. Motorola's extensive experience in high-reliability military and manned spacecraft programs such as Apollo, Minuteman and Safeguard, coupled with an investment of millions of dollars for research and development, has resulted in the ultimate in quality assurance for integrated circuits: the MOTOROLA MIL-M-38510 PROGRAM.

This comprehensive program is structured to provide an environment in which proven methods of manufacturing, quality assurance, monitoring, screening and testing can thrive — to give you **the most reliable product on the market today** — and to give it to you **fast!**

The MOTOROLA MIL-M-38510 PROGRAM is designed to support a broad base of test and evaluation programs for micro-electronic devices: materials, workmanship, performance capabilities, identification and processing — applied to all Motorola standard integrated circuit product, with appropriate levels of reliability. This product can be ordered in accordance with MIL-M-38510 JAN-**Qualified** standards or to the lower-cost, but similar hi-rel specifications designated as MIL-M-38510 JAN-**Processing.** (See ordering information.)

The MOTOROLA MIL-M-38510 PROGRAM is designed to facilitate delivery and to minimize specification preparation time. Beginning with a nucleus of popular IC types from our high-volume lines, the program is continually adding more devices to the list of MIL-M-38510 JAN-**Qualified** products.

Because it is a "standard" hi-rel program, the MOTOROLA MIL-M-38510 PROGRAM aids in reducing the high costs and delivery delays normally associated with "custom" hi-rel programs in the past.

It is a functional, operating program, based on the Military's own long-range objective to improve and demonstrate integrated circuit reliability, and is designed to provide hi-rel customers with the finest in quality, reliability and performance — fast!

THE MOTOROLA MIL-M-38510 PROGRAM OFFERS YOU THESE BENEFITS:

1. Standardization of environmental and electrical test procedures
2. Less specification writing required
3. Less time required in negotiating specifications
4. Fast delivery
5. Lower costs

THE MOTOROLA MIL-M-38510 PROGRAM

Under this program, Motorola integrated circuits may be procured to the specifications of MIL-M-38510 and to four levels of processing which meet the screening requirements of MIL-STD-883.

MIL-M-38510 JAN-QUALIFIED PRODUCT

Class A	Class B	Class C
	JAN-QUALIFIED DEVICE MARKINGS	
JM38510/XXXXXAXX	JM38510/XXXXXBXX	JM38510/XXXXXCXX

JAN QUALIFIED

1. **G.S.I. (Government Source Inspection) provided upon request.**
2. **Must be manufactured in a Government-approved facility.**
3. **Product inventoried in distributor and OEM warehouses.**

Examples of MIL-M-38510 JAN-**Qualified** markings:

	Linear	Digital
DEVICE:	MC1741BCBJ	MC5400BCBJ
ORDER:	MC1741BCBJ	MC5400BCBJ
MARKING:	JM38510/10101BCB	JM38510/00104BCB

HOW TO ORDER MIL-M-38510 JAN-QUALIFIED PRODUCT

Basic Numbering Parameters — Example: JM38510/XXXXXBCB

J	M38510	/XXX	XX	B	C	B
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) = J — This indicates a qualified device.
(2) = M38510 — The military designator.
(3) = /XXX — This three-digit number signifies the detail specification in which the device type is found. The detail specifications, also referred to as "slash specs," generally contain more than one device type and are written for various generic groupings (i.e., TTL NAND Gates, TTL NAND Buffers, TTL Flip-Flops, Op Amps, Voltage Regulators, etc.)
(4) = XX — This two-digit number identifies the device type within the detail specification.
(5) = B — This is a single letter and specifies the device class per MIL-M-38510 and will be class A, B or C.
(6) = Case Outline. (See listings in adjacent column).
(7) = Lead finish. (See listings in adjacent column).

The Motorola equivalent of the JAN M38510 part number is as shown in the following example and should be referenced when ordering your specific device requirement.

MCXXXX	BCB	J
(1)	(2)	(3)

1. The MCXXXX designates the Motorola source device type.
2. The first three letters after the part type have the same meaning and order as in the JAN part numbering system. This will simplify your cross-referencing.
3. J, which is the last letter in the part number, designates a JAN-qualified device.

Case outline and lead finish designations are common to both JAN Qualified and JAN Processed devices:

QUALIFIED # (6) PROCESSED # (3)

C — This is a single letter and specifies the package or case outline. A list of the currently-defined package types (the letters define the same case outline for all detail specifications) is shown below:

CASE OUTLINE DESIGNATOR	CASE OUTLINE
*A	— ¼" x ¼" flat pack, 14-pin
B	— ⅛" x ¼" flat pack, 14-pin
C	— ¼" x ¾" dual-in-line, 14-pin
*D	— ¼" x ⅜" flat pack, 14-pin
E	— ¼" x ¾" dual-in-line, 16-pin
F	— ¼" x ⅜" flat pack, 16-pin
G	— 8-lead can
H	— ¼" x ¼" flat pack, 10-lead
I	— 10-lead can
J	— ½" x 1¼" dual-in-line, 24-pin
K	— ⅜" x ½" flat pack, 24-pin
Z	— ¼" x ½" flat pack, 24-pin

— A and D outlines are interchangeable

MIL-M-38510 JAN-PROCESSED PRODUCT

Class A	Class B	Class C	Class D
JAN-PROCESSED DEVICE MARKINGS			
MC38510/XXXXAXXM	MC38510/XXXXBXXM	MC38510/XXXXCXXM	MC38510/XXXXDXXM
MC38510/XXXXAXXS	MC38510/XXXXBXXS	MC38510/XXXXCXXS	MC38510/XXXXDXXS

JAN PROCESSED

1. **No G.S.I. provided.**
2. **Government-approved facility not required.**
3. **Product supplied with MIL-M-38510 electricals will be designated by an "M" suffix.**
4. **Product supplied with Motorola standard data sheet electricals will be designated by an "S" suffix.**
5. **Devices will be manufactured using design and processing guidelines contained in MIL-M-38510.**
6. **Inventories will be maintained prior to burn-in and final electrical tests.**

Examples of MIL-M-38510 JAN-**Processed** markings:

	Linear
DEVICE:	MC1741BCB (M or S)
ORDER:	MC1741BCB (M or S)
MARKINGS:	MC38510/1741BCB (M or S)

	Digital
DEVICE:	MC5400BCB (M or S)
ORDER:	MC5400BCB (M or S)
MARKINGS:	MC38510/5400BCB (M or S)

QUALIFIED #(7) PROCESSED #(4)

B — This is a single letter and specifies the finish to be used on the package leads. There are three types of lead finishes which are acceptable for JAN product. They are:

LEAD FINISH SYMBOL	LEAD FINISH
A	— **Kovar or Alloy 42, with hot solder dip**
B	— **Kovar or Alloy 42, with bright acid tin plate**
C	— **Kovar or Alloy 42, with gold plate**

Note: For other Motorola standard packaging, not currently identified in MIL-M-38510, contact your Motorola representative.

HOW TO ORDER MIL-M-38510 JAN-PROCESSED PRODUCT

EXAMPLE: If you wish to enter an order for an MCXXXX Class B device in a 14-pin, dual-in-line ceramic package with the lead finish to be tin plate and electrically tested to Motorola's standard data sheet electricals, the order would be entered as follows:

MCXXXX	B	C	B	S
(1)	(2)	(3)	(4)	(5)

(1) = Motorola device type.

(2) = B — This is a single letter and specifies the device class per MIL-M-38510 for Classes A, B and C. Class D is an added Motorola JAN processing class and is the same as the MIL-M-38510 Class B except for the differences shown in the following screening procedures table.

(3) = Case Outline. (See listings in adjacent column).

(4) = Lead finish. (See listings in adjacent column).

(5) = S — This is a single letter and specifies the electrical specifications to which the device is to be screened during electrical test and will be either an S or M. "S" specifies the use of Motorola standard data sheet electricals. "M" specifies the use of JAN slash-sheet electricals where they exist.

Electrical Test Symbols	Test Level
S	— Motorola standard data sheet electricals
M	— JAN slash-sheet electricals

SCREENING PROCEDURES

(To MIL-STD-883 Requirements)

This program establishes screening procedures for total lot screening of integrated circuits to assist in achieving levels of quality and reliability commensurate with the intended application. In recognition of the fact that the level of screening has a direct impact on the cost of the product as well as its quality and reliability, four standard levels of screening are provided to coincide with four device classes or levels of product assurance.

Flexibility is provided in the choice of conditions and stress levels to provide screens, tailored to a particular product or application. Selection of a level **better** than that required for the specific product and application will, of course, result in unnecessary expense. A level **less** than that required will result in an unwarranted risk that reliability and other requirements will not be met. For general hi-rel applications, the Class B screening level should be considered.

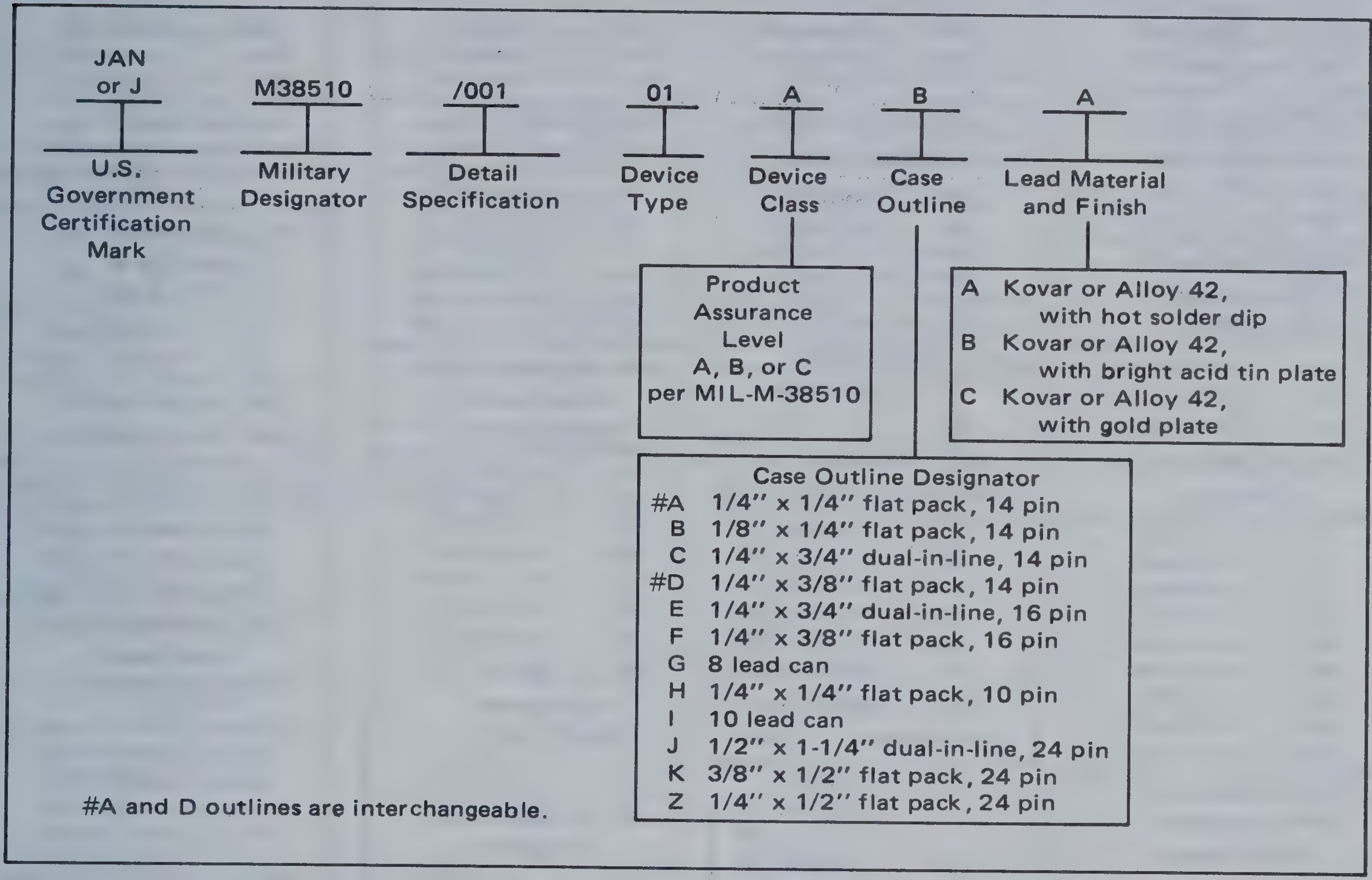
	CLASS A		CLASS B		CLASS C		CLASS D	
SCREEN	METHOD	RQMT	METHOD	RQMT	METHOD	RQMT	METHOD	RQMT
Internal Visual (Precap)	2010 Cond A and 38510	100%	2010 Cond B and 38510	100%	2010 Cond B and 38510	100%	2010 Cond B and 38510	100%
Stabilization Bake	1008 24 hrs min, test condition C	100%	1008, 24 hrs min, test condition C	100%	1008, 24 hrs min, test condition C	100%	1008, 24 hrs min, test condition C	100%
Thermal Shock	1011, Cond A	100%		—		—		—
Temperature Cycling	1010, Cond C	100%	1010, Cond C	100%	1010 Cond C	100%	1010, Cond C	100%
Mechanical Shock	2002 Cond F One Shock in Y_1 plane only or 5 shocks at Cond B in Y_1 plane	100%		—		—		—
Constant Acceleration	2001 Cond E (min) in Y_2 plane then Y_1 plane	100%	2001 Cond E (min) Y_1 plane	100%	2001 Cond E (min) Y_1 plane	100%	2001 Cond E (min) Y_1 plane	100%
Seal (a) Fine (b) Gross	1014	100%	1014	100%	1014	100%	1014	100%
Interim Electrical Parameters	JAN slash-sheet electrical specification unless otherwise designated	100%	JAN slash-sheet electrical specifications unless otherwise designated	100%		—	Motorola stand. data sheet electrical specs unless otherwise indicated	100%
Burn-in test	1015 240 hrs @ 125°C min	100%	1015 168 hrs @ 125°C min	100%		—	1015 168 hrs @ 125°C min	100%
Interim Electricals	JAN slash-sheet electrical specifications unless otherwise designated	100%						
Reverse Bias Burn-in	1015 Cond A or C 72 hrs at 150°C min	100%						
Final Electrical tests (a) Static tests (1) 25°C (Subgroup 1 table 1 5005)	JAN slash-sheet electrical specifications unless otherwise designated	100%	JAN slash-sheet electrical specifications unless otherwise designated	100%	JAN slash-sheet electrical specifications unless otherwise designated	100%	Motorola stand. data sheet electrical specs unless otherwise indicated	100%
(2) Max and min rated op. temperature (subgroups 2 and 3 table 1, 5005)		100%		100%		—		—
(b) Dynamic tests and/or switching tests 25°C (subgroup 4 and 9 table 1, 5005)		100%		100%		—		—
(C) Functional test 25°C (subgroup 7 table 1, 5005)		100%		100%		100%		100%
Radiographic	2012	100%		—		—		—
Qualification or quality conformance inspection	5005 Class A	per 38510 *	5005 Class B	per 38510 *	5005 Class C	per 38510 *	5005 Class B	*
External Visual	2009	100%	2009	100%	2009	100%	2009	100%

*Group A per 5005, Generic data available for groups B & C on devices produced to Class B, C, D for JAN processed (from JAN program)

INTEGRATED CIRCUITS

A typical military part number consists of the JAN prefix, the general specification number, the detail specification number, and a coded part number.

PART NUMBER DESCRIPTION



A Kovar or Alloy 42, with hot solder dip
B Kovar or Alloy 42, with bright acid tin plate
C Kovar or Alloy 42, with gold plate

Case Outline Designator

#A	1/4" x 1/4" flat pack, 14 pin
B	1/8" x 1/4" flat pack, 14 pin
C	1/4" x 3/4" dual-in-line, 14 pin
#D	1/4" x 3/8" flat pack, 14 pin
E	1/4" x 3/4" dual-in-line, 16 pin
F	1/4" x 3/8" flat pack, 16 pin
G	8 lead can
H	1/4" x 1/4" flat pack, 10 pin
I	10 lead can
J	1/2" x 1-1/4" dual-in-line, 24 pin
K	3/8" x 1/2" flat pack, 24 pin
Z	1/4" x 1/2" flat pack, 24 pin

#A and D outlines are interchangeable.

TABLE I — JAN PART NUMBER TO MOTOROLA PART NUMBER CROSS REFERENCE

Contact your local Motorola sales office or franchised distributor for current qualification status and availability.

MTTL INTEGRATED CIRCUITS

MIL-M-38510/001 NAND Gates

JAN Part No.**	Motorola Standard Part No.
01	MC5430
02	MC5420
03	MC5410
04	MC5400
05	MC5404
06	MC5412 *
07	MC5401
08	MC5405
09	MC5403

MIL-M-38510/002 Flip-Flops

JAN Part No.**	Motorola Standard Part No.
01	MC5472
02	MC5473
03	MC54107
04	MC5476
05	MC5474 *
06	MC5470
07	MC5479

MIL-M-38510/003 NAND Buffers

JAN Part No.**	Motorola Standard Part No.
01	MC5440
02	MC5437
03	MC5438

MIL-M-38510/004 NOR Gates

JAN Part No.**	Motorola Standard Part No.
01	MC5402
02	MC5423
03	MC5425
04	MC5427

MIL-M-38510/005 AND-OR-INVERT Gates

JAN Part No.**	Motorola Standard Part No.
01	MC5450
02	MC5451
03	MC5453
04	MC5454

MIL-M-38510/006 Binary Full Adders

JAN Part No.**	Motorola Standard Part No.
01	MC15482
02	MC5483

MIL-M-38510/007 Exclusive OR Gate

JAN Part No.**	Motorola Standard Part No.
01	MC3121

MIL-M-38510/008 Hex Buffers/Drivers

JAN Part No.**	Motorola Standard Part No.
01	MC5406
02	MC5416
03	MC5407
04	MC5417

MIL-M-38510/009 Shift Registers

JAN Part No.**	Motorola Standard Part No.
01	MC5495
02	MC5496
03	MC54164A
04	MC54165
05	MC54194
06	MC54195

MIL-M-38510/010 Decoders

JAN Part No.**	Motorola Standard Part No.
01	MC5442
02	MC5443
03	MC5444
04	MC5445
05	MC54145
06	MC5446 *
07	MC5447 *
08	MC5448
09	MC5449

* Not presently being manufactured or planned for immediate introduction.
** JAN type number must be completed as shown in the Part Number Description.

TABLE I – JAN PART NUMBER TO MOTOROLA PART NUMBER CROSS REFERENCE (continued)

MTTL INTEGRATED CIRCUITS (continued)

JAN Part No.**	Motorola Standard Part No.
MIL-M-38510/011 Arithmetic Logic Unit	
01	MC54181
MIL-M-38510/012 Monostable Multivibrators	
01	MC54121
02	MC54122
03	MC54123
MIL-M-38510/013 Counters	
01	MC5492
02	MC5493
03	MC54160
04	MC54163
05	MC54162
06	MC54161
07	MC5490
08	MC54192
09	MC54193
MIL-M-38510/014 Data Selectors/ Multiplexers	
01	MC54150
02	MC9312
03	MC54153
04	MC9309
05	MC9322
06	MC54151
MIL-M-38510/015 Bistable Latches	
01	MC5475
02	MC5477
03	MC9308
04	MC9314
MIL-M-38510/016 AND Gates	
01	MC5408
02	MC5409
MIL-M-38510/020 Low-Power NAND Gates	
01	MC54L30*
02	MC54L20*
03	MC54L10*
04	MC54L00*
05	MC54L04*
06	MC54L03*
MIL-M-38510/021 Low-Power Flip-Flops	
01	MC54L71*
02	MC54L72*
03	MC54L73*
04	MC54L78*
05	MC54L74*
MIL-M-38510/022 High-Speed Flip-Flops	
01	MC54H72
02	MC54H73
03	MC54H74A
04	MC54H76*
05	MC54H101
06	MC54H103
MIL-M-38510/023 High-Speed NAND Gates	
01	MC54H30
02	MC54H20
03	MC54H10
04	MC54H00
05	MC54H04
06	MC54H01
07	MC54H22
MIL-M-38510/024 High-Speed NAND Buffer	
01	MC54H40
MIL-M-38510/025 Counters	
01	MC54L90*
02	MC54L93*
MIL-M-38510/026 Low-Power Exclusive OR Gate	
01	MC54L86*
MIL-M-38510/027 Low-Power NOR Gate	
01	MC54L02*
MIL-M-38510/028 Low-Power Shift Registers	
01	MC54L95*
02	MC54L164*
MIL-M-38510/029 Low-Power Decoders	
01	MC54L42*
02	MC54L43*
03	MC54L44*
04	MC54L46*
05	MC54L47*
MIL-M-38510/040 High-Speed AND-OR-INVERT Gates	
01	MC54H50
02	MC54H51
03	MC54H53
04	MC54H54
05	MC54H55
MIL-M-38510/041 Low-Power AND-OR-INVERT Gates	
01	MC54L51*
02	MC54L54*
03	MC54L55*

MDTL INTEGRATED CIRCUITS

JAN Part No.**	Motorola Standard Part No.
MIL-M-38510/030 NAND Gates	
01	MC930
02	MC935
03	MC936
04	MC946
05	MC962

*Not presently being manufactured or planned for immediate introduction.

**JAN type number must be completed as shown in the Part Number Description.

DEVICES FOR MILITARY APPLICATIONS (continued)

TABLE I – JAN PART NUMBER TO MOTOROLA PART NUMBER CROSS REFERENCE (continued)

McMOS INTEGRATED CIRCUITS

MIL-M-38510/050 NAND Gates

JAN Part No.**	Motorola Standard Part No.
01	MC14011A
02	MC14012A
03	MC14023A

MIL-M-38510/051 Flip-Flops

JAN Part No.**	Motorola Standard Part No.
01	MC14013A
02	MC14027A

MIL-M-38510/052 NOR Gates

JAN Part No.**	Motorola Standard Part No.
01	MC14000A
02	MC14001A
03	MC14002A
04	MC14025A

MIL-M-38510/053 AND-OR-INVERT Gates

JAN Part No.**	Motorola Standard Part No.
01	MC14007A
02	MC14019A*

MIL-M-38510/054 4-Bit Full Adder

JAN Part No.**	Motorola Standard Part No.
01	MC14008A

MIL-M-38510/055 Buffers/Converters

JAN Part No.**	Motorola Standard Part No.
01	MC14009A
02	MC14010A
03	MC14049A
04	MC14050A

MIL-M-38510/056 Counters/Dividers

JAN Part No.**	Motorola Standard Part No.
01	MC14017A
02	MC14018A*
03	MC14020A
04	MC14022A
05	MC14024A

MIL-M-38510/057 Static Shift Registers

JAN Part No.**	Motorola Standard Part No.
01	MC14006A
02	MC14014A*
03	MC14015A
04	MC14021A
05	MC14031A*

MIL-M-38510/058 Quad Analog Switch

JAN Part No.**	Motorola Standard Part No.
01	MC14016A

MECL 10,000 INTEGRATED CIRCUITS

MIL-M-38510/060# NOR Gates

JAN Part No.**	Motorola Standard Part No.
01	MC10501
02	MC10502
03	MC10505
04	MC10506
05	MC10507
06	MC10509

LINEAR INTEGRATED CIRCUITS

MIL-M-38510/101 Operational Amplifiers

JAN Part No.**	Motorola Standard Part No.
01	MC1741
02	MC1747
03	MLM101A
04	MLM108A

MIL-M-38510/102 Voltage Regulator

JAN Part No.**	Motorola Standard Part No.
01	MC1723

MIL-M-38510/103 Voltage Comparators

JAN Part No.**	Motorola Standard Part No.
01	MC1710
02	MC1711
03	MLM106*
04	MLM111*

MIL-M-38510/104 Line Drivers and Receivers

JAN Part No.**	Motorola Standard Part No.
01	MC55107
02	MC55108
03	MC9614*
04	MC9615*
05	MC55113*

MIL-M-38510/105 Video Amplifier

JAN Part No.**	Motorola Standard Part No.
01	MC1733

MIL-M-38510/106 Voltage Follower Operational Amplifiers

JAN Part No.**	Motorola Standard Part No.
01	MLM102*
02	MLM110

MIL-M-38510/107 Voltage Regulator

JAN Part No.**	Motorola Standard Part No.
01	MLM109

MEMORIES

MIL-M-38510/201 Programmable Read Only Memories

JAN Part No.**	Motorola Standard Part No.
01	MCM5303
02	MCM5304

*Not presently being manufactured or planned for immediate introduction.

**JAN type number must be completed as shown in the Part Number Description.

#A draft of MIL-M-38510/060 has been issued. A series of MIL-M-38510 specifications has been reserved for the complete line of MECL devices including flip-flops, decoders, and arithmetic units.

DEVICES FOR MILITARY APPLICATIONS (continued)

TABLE II – MOTOROLA PART NUMBER TO JAN PART NUMBER CROSS REFERENCE

MTTL INTEGRATED CIRCUITS

Motorola Standard Part No.	Description	JAN Part No.**
MC15482	2-Bit Full Adder	/006 01
MC3121	Quad 2-Input Exclusive OR Gate	/007 01
MC5400	Quad 2-Input Positive NAND Gate	/001 04
MC5401	Quad 2-Input Positive NAND Gate (Open Collector Output)	/001 07
MC5402	Quad 2-Input Positive NOR Gate	/004 01
MC5403	Quad 2-Input Positive NAND Gate (Open Collector Output) (Pin connections different from MC5401)	/001 09
MC5404	Hex 1-Input Inverter Gate	/001 05
MC5405	Hex 1-Input Inverter Gate (Open Collector Output)	/001 08
MC5406	Hex Inverter Buffer/Driver (30-Volt Output)	/008 01
MC5407	Hex Buffer/Driver (30-Volt Output)	/008 03
MC5408	Quad 2-Input Positive AND Gate	/016 01
MC5409	Quad 2-Input Positive AND Gate (Open Collector Output)	/016 02
MC5410	Triple 3-Input Positive NAND Gate	/001 03
MC5412 *	Triple 3-Input Positive NAND Gate (Open Collector Output)	/001 06
MC5416	Hex Inverter Buffer/Driver (15-Volt Output)	/008 02
MC5417	Hex Buffer/Driver (15-Volt Output)	/008 04
MC5420	Dual 4-Input Positive NAND Gate	/001 02
MC5423	Dual 4-Input Positive NOR Gate with Strobe and Expandable Input	/004 02
MC5425	Dual 4-Input Positive NOR Gate with Strobe	/004 03
MC5427	Triple 3-Input Positive NOR Gate	/004 04
MC5430	Single 8-Input Positive NAND Gate	/001 01
MC5437	Quad 2-Input Positive NAND Buffer	/003 02
MC5438	Quad 2-Input Positive NAND Buffer (Open Collector Output)	/003 03
MC5440	Dual 4-Input Positive NAND Buffer	/003 01
MC5442	BCD-to-Decimal Decoder	/010 01
MC5443	Excess-3-to-Decimal Decoder	/010 02
MC5444	Excess-3-Gray-to-Decimal Decoder	/010 03
MC5445	BCD-to-Decimal Decoder/Driver (30-Volt, Open Collector Output)	/010 04
MC5446 *	BCD-to-Seven-Segment Decoder/Driver (30-Volt, Open Collector Output)	/010 06
MC5447 *	BCD-to-Seven-Segment Decoder/Driver (15-Volt, Open Collector Output)	/010 07
MC5448	BCD-to-Seven-Segment Decoder/Driver	/010 08
MC5449	BCD-to-Seven-Segment Decoder/Driver (5.5-Volt, Open Collector Output)	/010 09
MC5450	Expandable Dual 2-Wide, 2-Input AND-OR-INVERT Gate	/005 01
MC5451	Dual 2-Wide, 2-Input AND-OR-INVERT Gate	/005 02
MC5453	Expandable 4-Wide, 2-Input AND-OR-INVERT Gate	/005 03
MC5454	4-Wide, 2-Input AND-OR-INVERT Gate	/005 04
MC5470	Single Edge-Triggered J-K Flip-Flop	/002 06
MC5472	Single J-K Master-Slave Flip-Flop	/002 01
MC5473	Dual J-K Master-Slave Flip-Flop (No Preset)	/002 02
MC5474 *	Dual D-Type Edge-Triggered Flip-Flop	/002 05
MC5475	4-Bit Latch (Complementary Outputs)	/015 01
MC5476	Dual J-K Master-Slave Flip-Flop	/002 04
MC5477	4-Bit Latch	/015 02
MC5479	Dual D-Type Edge-Triggered Flip-Flop (Buffered Output)	/002 07
MC5483	4-Bit Full Adder	/006 02
MC5490	Decade Counter	/013 07
MC5492	Divide-by-12 Counter	/013 01
MC5493	4-Bit Binary Counter	/013 02
MC5495	4-Bit Right-Shift, Left-Shift Register	/009 01
MC5496	5-Bit Shift Register	/009 02
MC54107	Dual J-K Master-Slave Flip-Flop (No Preset)	/002 03
MC54121	Single Monostable Multivibrator	/012 01
MC54122	Single Retriggerable Monostable Multivibrator with Clear	/012 02
MC54123	Dual Retriggerable Monostable Multivibrator with Clear	/012 03
MC54145	BCD-to-Decimal Decoder/Driver (15-Volt, Open Collector Output)	/010 05
MC54150	16-Input Data Selector/Multiplexer, with Enable	/014 01
MC54151	8-Input Data Selector/Multiplexer, with Enable	/014 06
MC54153	Dual 4-Input Data Selector/Multiplexer, with Enable	/014 03
MC54160	Synchronous 4-Bit Decade Counter (Asynchronous Clear)	/013 03
MC54161	Synchronous 4-Bit Binary Counter (Asynchronous Clear)	/013 06

* Not presently being manufactured or planned for immediate introduction.

** JAN type number must be completed as shown in the Part Number Description.

TABLE II – MOTOROLA PART NUMBER TO JAN PART NUMBER CROSS REFERENCE (continued)

MTTL INTEGRATED CIRCUITS (continued)

Motorola Standard Part No.	Description	JAN Part No.**
MC54162	Synchronous 4-Bit Decade Counter (Synchronous Clear)	/013 05
MC54163	Synchronous 4-Bit Binary Counter (Synchronous Clear)	/013 04
MC54164A	8-Bit Parallel-Out Serial Shift Register	/009 03
MC54165	8-Bit Parallel-Load Shift Register	/009 04
MC54181	Arithmetic Logic Unit/Function Generator	/011 01
MC54192	Presettable Decade Up/Down Counter	/013 08
MC54193	Presettable 4-Bit Binary Up/Down Counter	/013 09
MC54194	4-Bit Bidirectional Shift Register	/009 05
MC54195	4-Bit Parallel-Access Shift Register	/009 06
MC54H00	Quad 2-Input Positive NAND Gate (High-Speed)	/023 04
MC54H01	Quad 2-Input Positive NAND Gate (High-Speed, Open Collector Output)	/023 06
MC54H04	Hex 1-Input Inverter Gate (High-Speed)	/023 05
MC54H10	Triple 3-Input Positive NAND Gate (High-Speed)	/023 03
MC54H20	Dual 4-Input Positive NAND Gate (High-Speed)	/023 02
MC54H22	Dual 4-Input Positive NAND Gate (High-Speed, Open Collector Output)	/023 07
MC54H30	Single 8-Input Positive NAND Gate (High-Speed)	/023 01
MC54H40	Dual 4-Input Positive NAND Buffer (High-Speed)	/024 01
MC54H50	Expandable Dual 2-Wide, 2-Input AND-OR-INVERT Gate (High-Speed)	/040 01
MC54H51	Dual 2-Wide, 2-Input AND-OR-INVERT Gate (High-Speed)	/040 02
MC54H53	Expandable 4-Wide 2-2-2-3 Input AND-OR-INVERT Gate (High-Speed)	/040 03
MC54H54	4-Wide 2-2-2-3 Input AND-OR-INVERT Gate (High-Speed)	/040 04
MC54H55	Expandable 2-Wide, 4-Input AND-OR-INVERT Gate	/040 05
MC54H72	Single J-K Master-Slave Flip-Flop (High-Speed)	/022 01
MC54H73	Dual J-K Master-Slave Flip-Flop (High-Speed)	/002 02
MC54H74A	Dual D-Type Edge-Triggered Flip-Flop (High-Speed)	/022 03
MC54H76*	Dual J-K Flip-Flop (High-Speed)	/022 04
MC54H101	J-K Edge-Triggered Flip-Flop (High-Speed)	/022 05
MC54H103	Dual J-K Edge-Triggered Flip-Flop (High-Speed)	/022 06
MC54L00*	Quad 2-Input Positive NAND Gate (Low-Power)	/020 04
MC54L02*	Quad 2-Input Positive NOR Gate (Low-Power)	/027 01
MC54L03*	Quad 2-Input Positive NAND Gate (Low-Power, Open Collector Output)	/020 06
MC54L04*	Hex 1-Input Inverter Gate (Low-Power)	/020 05
MC54L10*	Triple 3-Input Positive NAND Gate (Low-Power)	/020 03
MC54L20*	Dual 4-Input Positive NAND Gate (Low-Power)	/020 02
MC54L30*	Single 8-Input Positive NAND Gate (Low-Power)	/020 01
MC54L42*	BCD-to-Decimal Decoder (Low-Power)	/029 01
MC54L43*	Excess-3-to-Decimal Decoder (Low-Power)	/029 02
MC54L44*	Excess-3-Gray-to-Decimal Decoder (Low-Power)	/029 03
MC54L46*	BCD-to-Seven-Segment Decoder/Driver (Low-Power, 30-Volt, Open Collector Output)	/029 04
MC54L47*	BCD-to-Seven-Segment Decoder/Driver (Low-Power, 15-Volt, Open Collector Output)	/029 05
MC54L51*	Dual 2-Wide AND-OR-INVERT Gate (Low-Power)	/041 01
MC54L54*	4-Wide, 3-2-2-3 Input AND-OR-INVERT Gate (Low-Power)	/041 02
MC54L55*	2-Wide, 4-Input AND-OR-INVERT Gate (Low-Power)	/041 03
MC54L71*	R-S Master-Slave Flip-Flop (Low-Power)	/021 01
MC54L72*	J-K Master-Slave Flip-Flop (Low-Power)	/021 02
MC54L73*	Dual J-K Master-Slave Flip-Flop (Low-Power)	/021 03
MC54L74*	Dual D-Type Edge-Triggered Flip-Flop (Low-Power)	/021 05
MC54L78*	Dual J-K Master-Slave Flip-Flop (Low-Power)	/021 04
MC54L86*	Quad 2-Input Exclusive OR Gate (Low-Power)	/026 01
MC54L90*	Decade Counter (Low-Power)	/025 01
MC54L93*	4-Bit Binary Counter (Low-Power)	/025 02
MC54L95*	4-Bit Right-Shift, Left-Shift Register (Low-Power)	/028 01
MC54L164*	8-Bit Parallel-Out Serial Shift Register (Low-Power)	/028 02
MC9308	Dual 4-Bit Latch	/015 03
MC9309	Dual 4-Input Data Selector/Multiplexer, without Enable	/014 04
MC9312	8-Input Data Selector/Multiplexer, with Enable	/014 02
MC9314	4-Bit Latch, with Master Reset	/015 04
MC9322	Quad 2-Input Data Selector/Multiplexer, with Enable	/014 05

*Not presently being manufactured or planned for immediate introduction.

**JAN type number must be completed as shown in the Part Number Description.

DEVICES FOR MILITARY APPLICATIONS (continued)

TABLE II – MOTOROLA PART NUMBER TO JAN PART NUMBER CROSS REFERENCE (continued)

MDTL INTEGRATED CIRCUITS

Motorola Standard Part No.	Description	JAN Part No.**
MC930	Expandable Dual 4-Input NAND Gate	/030 01
MC935	Hex Inverter, Without Output Resistors	/030 02
MC936	Hex Inverter	/030 03
MC946	Quad 2-Input NAND Gate	/030 04
MC962	Triple 3-Input NAND Gate	/030 05

McMOS INTEGRATED CIRCUITS

Motorola Standard Part No.	Description	JAN Part No.**
MC14000A	Dual 3-Input NOR Gate plus Inverter	/052 01
MC14001A	Quad 2-Input NOR Gate	/052 02
MC14002A	Dual 4-Input NOR Gate	/052 03
MC14006A	Dual 4-Stage/Dual 5-Stage Static Shift Register	/057 01
MC14007A	Dual Complementary Pair plus Inverter	/053 01
MC14008A	4-Bit Full Adder	/054 01
MC14009A	Inverting Hex Buffer	/055 01
MC14010A	Non-Inverting Hex Buffer	/055 02
MC14011A	Quad 2-Input NAND Gate	/050 01
MC14012A	Dual 4-Input NAND Gate	/050 02
MC14013A	Dual D-Type Edge-Triggered Flip-Flop	/051 01
MC14014A*	8-Stage Synchronous Parallel or Serial Input/Serial Output Static Shift Register	/057 02
MC14015A	Dual 4-Stage Serial Input/Parallel Output Static Shift Register	/057 03
MC14016A	Quad Analog Switch/Quad Multiplexer	/058 01
MC14017A	Decade Counter/Divider	/056 01
MC14018A*	Presettable Divide-by-N Counter	/056 02
MC14019A*	Quad AND-OR-Select Gate	/053 02
MC14020A	14-Stage Ripple-Carry Binary Counter/Divider	/056 03
MC14021A	8-Stage Asynchronous Parallel Input/Serial Output or Synchronous Serial Input/Serial Output Static Shift Register	/057 04
MC14022A	Divide-by-8 Counter/Divider	/056 04
MC14023A	Triple 3-Input NAND Gate	/050 03
MC14024A	7-Stage Binary Counter	/056 05
MC14025A	Triple 3-Input NOR Gate	/052 04
MC14027A	Dual J-K Master-Slave Flip-Flop	/051 02
MC14031A*	64-Stage Static Shift Register with Delayed Clock Output and Recirculation Capability	/057 05
MC14049A	Hex Buffer	/055 03
MC14050A	Hex Buffer	/055 04

MECL 10,000 INTEGRATED CIRCUITS

Motorola Standard Part No.	Description	JAN Part No.**
MC10501	Quad OR/NOR Gate with Strobe	/060 01
MC10502	Triple 2-Input NOR Gate Plus 2-Input OR/NOR Gate	/060 02
MC10505	Triple 2-3-2 Input OR/NOR Gate	/060 03
MC10506	Triple 4-3-3 Input NOR Gate	/060 04
MC10507	Triple Exclusive OR/NOR Gate	/060 05
MC10509	Dual 4-5 Input OR/NOR Gate	/060 06

DEVICES FOR MILITARY APPLICATIONS (continued)

TABLE II – MOTOROLA PART NUMBER TO JAN PART NUMBER CROSS REFERENCE (continued)

LINEAR INTEGRATED CIRCUITS

Motorola Standard Part No.	Description	JAN Part No.**
MC1710	Single Differential Voltage Comparator	/103 01
MC1711	Dual Channel Differential Voltage Comparator	/103 02
MC1723	Precision Voltage Regulator	/102 01
MC1733	Video Amplifier	/105 01
MC1741	Single Operational Amplifier (Internally Compensated)	/101 01
MC1747	Dual Operational Amplifier (Internally Compensated)	/101 02
MC9614*	Dual Differential Line Driver	/104 03
MC9615*	Dual Differential Line Receiver	/104 04
MC55107	Dual Line Receiver	/104 01
MC55108	Dual Line Receiver (Open Collector Output)	/104 02
MC55113*	Dual Differential Line Driver (3-State Output With High-Impedance Off-State.	/104 05
MLM101A	Single Operational Amplifier (Externally Compensated)	/101 03
MLM102*	Voltage Follower Operational Amplifier	/106 01
MLM106*	Single Voltage Comparator/Buffer	/103 03
MLM108A	Single Operational Amplifier (Externally Compensated)	/101 04
MLM109	Voltage Regulator	/107 01
MLM110	Voltage Follower Operational Amplifier	/106 02
MLM111*	Precision Voltage Comparator/Buffer	/103 04

MEMORIES

Motorola Standard Part No.	Description	JAN Part No.**
MCM5303	64-Word/8-Bits-per-Word PROM (Open Collector Output)	/201 01
MCM5304	64-Word/8-Bits-per-Word PROM (Internal Pullup Resistor)	/201 02

*Not presently being manufactured or planned for immediate introduction.

**JAN type number must be completed as shown in the Part Number Description.

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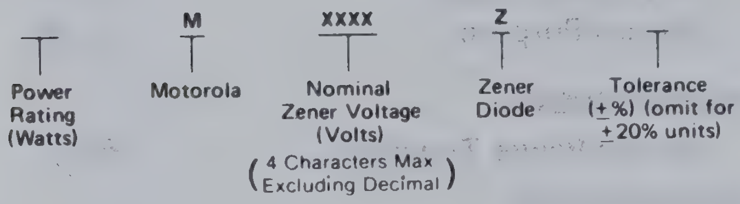
ZENER DIODE DEVICE OPTION

Motorola manufactures a complete line of zener diodes. The following pages describe the many device types available as standard products that are stocked at the factory warehouse and with distributors. Although Motorola standard zener diodes will handle most of the industry's needs, they represent only a small fraction of the devices that can be supplied. In cases where a non-standard set of specifications is required, the appropriate device can be selected and ordered from the following device options.

NON-STANDARD ZENER DIODES SPECIAL VOLTAGE AND TOLERANCE RATINGS

JEDEC "1N" type numbers denote a specific Zener voltage, power rating, and tolerance. For example, JEDEC type 1N4728 is a standard 1 watt diode, rated at 3.3 volts ±10%. A suffix "A" on this type number indicates a ±5% voltage tolerance.

Special Motorola devices, with a choice of voltages and tolerances are also available. The following diagram explains the Motorola coding system:


M
XXXX
Z
Power Rating (Watts)
Motorola
Nominal Zener Voltage (Volts)
(4 Characters Max Excluding Decimal)
Zener Diode
Tolerance (±%) (omit for ±20% units)

For example, the code for a special 10 watt Zener diode with a voltage of 41 volts and a tolerance of ±1% would be: 10M41Z1.

Following is a list of other standard Motorola symbols for special Zener orders (X's indicate nominal Zener voltage):

BASIC MOTOROLA TYPE	DEVICE DESCRIPTION
¼MXXXAZ5	250 mW Alloy Glass, ±5%
¼MXXXZ5	250 mW Glass, ±5%
.4MXXXAZ5	400 mW Alloy Glass, ±5%
.4MXXXZ10	400 mW Glass, ±10%
.5MXXXZS10	500 mW Surmetic, ±10%
1MXXXAZ10	1 Watt Alloy Flangeless, ±10%
1MXXXZ10	1 Watt Flangeless, ±10%
1MXXXZS5	1 Watt Surmetic, ±5%
1.5MXXXZ	1.5 Watt, ±20%
5MXXXZS5	5 Watt Surmetic, ±5%
10MXXXAZ5	10 Watt Alloy Stud, ±5%
10MXXXZ10	10 Watt Stud, ±10%
50MXXXAZ10	50 Watt Alloy TO-3, ±10%
50MXXXASZ5	50 Watt Alloy Stud, ±5%
50MXXXZ	50 Watt TO-3, ±20%
50MXXXSZ5	50 Watt Stud, ±5%

For reverse polarities (10 W and 50W), insert "R" before tolerance, ie., 50M110SZR5.

1N5518 thru 1N5546 – This series may be ordered in ±2% and ±1% tolerance by adding the following suffix:

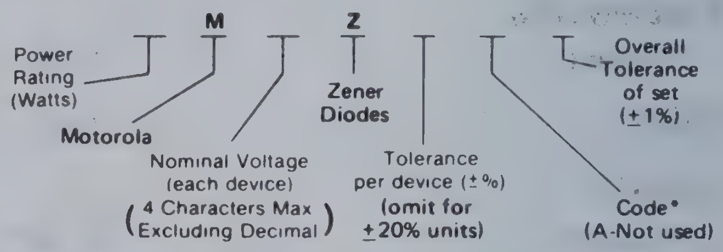
C = ±2% D = ±1%

For example, the 1N5518D would be the same as the 1N5518B except V_Z = 3.3 ±1%.

MATCHED SETS OF ZENER DIODES

Zener diodes can also be obtained in sets consisting of two or more matched devices. The method for specifying such matched sets is similar to the one described for specifying units with a special voltage and/or tolerance except that two extra suffixes are added to the code number described above.

These units are marked with code letters to identify the matched sets and in addition, each unit in a set is marked with the same serial number which is different for each set being ordered.


M
Z
Power Rating (Watts)
Motorola
Nominal Voltage (each device) (4 Characters Max Excluding Decimal)
Zener Diodes
Tolerance per device (±%) (omit for ±20% units)
Overall Tolerance of set (±1%)
Code* (A-Not used)

*Code

- B – Two devices in series
- C – Three devices in series
- D – Four devices in series
- E – Five devices in series
- F – Six devices in series
- G – Seven devices in series
- H – Eight devices in series
- P – Two devices in parallel (not recommended)
- X – Two devices; one standard polarity, the other reverse polarity. (10 and 50 watts only)

i.e., 10M51Z5B1 is for two 10 watt zeners, each of 51 volts, ±5%, matched to a total voltage of 102 volts ±1%.

ORDERING OF MATCHED SETS

Order per instructions in "Matched Sets of Zener Diodes" or else specify the following:

- Type of matched set (series or parallel)
- Number of units per set
- Device type (with proper suffix to indicate tolerance
- Number of sets required
- Total voltage and overall tolerance of the set

ADDITIONAL NOTES

Consult factory for pricing and ordering information on special sets. For example: 1)Sets with overall tolerance different from those shown; 2) Matched sets of temperature compensated devices; 3) Sets which require basic device types within the set to be different from each other; 4) Sets with device type nominal voltages outside the range of the Zener family involved; 5) Tight tolerance temperature compensated diodes.

ZENER DIODE DEVICE OPTION (continued)

ZENER CHIPS (MZC)

1. The nomenclature for Zener Chips is as follows:

M	Z	C			
Motorola	Zener	C = Chip	Nominal Voltage	Series (A or B)	Tolerance (± %)
BASIC TYPE MOTOROLA NOMENCLATURE			**DEVICE DESCRIPTION**		

MZCXXAX	Zener Chip — "A" Series, High Level
MZCXXBX	Zener Chip — "B" Series, Low Level

2. Chips are sold in increments of ten (10) only
3. Chips are **not** sold as matched sets or clippers.
4. A "-1" suffix will cause all chips ordered to be supplied in Deka-Pak.

ZENER CLIPPERS

Special clipper diodes with opposing Zener junctions built into the devices are available by using the following nomenclatures:

X	M	XXX	Z	Z	X
Power Rating (Watts)		Nominal Voltage	Zener Diode	Clipper	Tolerance for each of the two Zener Voltages (Is not a matching requirement. Omit for ± 20% Units.)

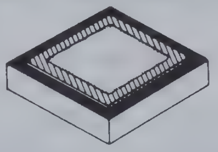
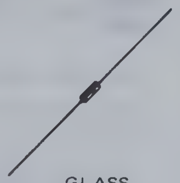
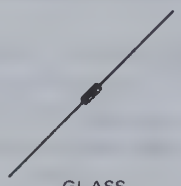
This nomenclature is applicable to all packages and power ratings as restricted in the above paragraphs.

ORDERING INFORMATION

Order using the above nomenclature or else specify the device type, nominal voltage and tolerance required.

ZENER DIODES

The devices listed in the following tables represent a basic profile of the largest inventoried Zener diode line in the industry. These diodes may be employed where a nearly constant dc output voltage is required despite relatively large changes in input voltage or load resistance. Motorola's devices represent state-of-the-art with the superior capability of silicon-oxide passivated junction for low leakage, sharp breakdowns and long-term stability.

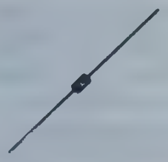
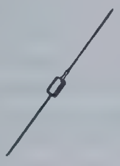
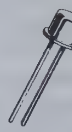
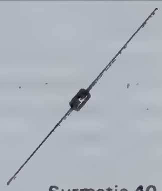
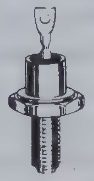
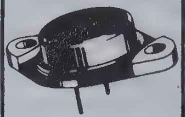
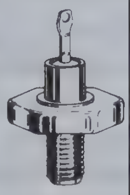
Nominal Zener Voltage (NOTE 1, 6)	CHIPS (25 Mils Square) Cathode = Bottom Surface		250 MILLIWATT (400 mW Package) Cathode = Polarity Mark	400 MILLIWATT Cathode = Polarity Mark		500 MILLIWATT Cathode = Polarity Mark	
	 MZC		 GLASS CASE 51 (DO-7)	 GLASS CASE 51 (DO-7)		Surmetic CASE 182 (TO-92)	Surmetic 20 CASE 51 (DO-7)
	HIGH LEVEL (NOTE 7)	LOW LEVEL (NOTE 7)	INDUSTRIAL ±5% TOLERANCE LOW NOISE LOW LEVEL	CONSUMER INDUSTRIAL (NOTE 2, 3, 8)	INDUSTRIAL LOW VOLTAGE AVALANCHE	CONSUMER INDUSTRIAL (NOTE 3,5b)	CONSUMER INDUSTRIAL (NOTE 5a)
1.8		MZC1.8B10	MZ4614				
2.0		MZC2.0B10	MZ4615				
2.2		MZC2.2B10	MZ4616				
2.4	MZC2.4A10	MZC2.4B10	MZ4617	1N4370		1N5837A	1N5221
2.7	MZC2.7A10	MZC2.7B10	MZ4618	1N4371		1N5839A	1N5223
3.0	MZC3.0A10	MZC3.0B10	MZ4619	1N4372		1N5841A	1N5225
3.3	MZC3.3A10	MZC3.3B10	MZ4620	1N746	1N5518	1N5842A	1N5226
3.6	MZC3.6A10	MZC3.6B10	MZ4621	1N747	1N5519	1N5843A	1N5227
3.9	MZC3.9A10	MZC3.9B10	MZ4622	1N748	1N5520	1N5844A	1N5228
4.3	MZC4.3A10	MZC4.3B10	MZ4623	1N749	1N5521	1N5845A	1N5229
4.7	MZC4.7A10	MZC4.7B10	MZ4624	1N750	1N5522	1N5846A	1N5230
5.1	MZC5.1A10	MZC5.1B10	MZ4625	1N751	1N5523	1N5847A	1N5231
5.6	MZC5.6A10	MZC5.6B10	MZ4626	1N752	1N5524	1N5848A	1N5232
6.2	MZC6.2A10	MZC6.2B10	MZ4627	1N753	1N5525	1N5850A	1N5234
6.8	MZC6.8A10	MZC6.8B10	1N4099	1N754 1N957	1N5526	1N5851A	1N5235
7.5	MZC7.5A10	MZC7.5B10	1N4100	1N755 1N958	1N5527	1N5852A	1N5236
8.2	MZC8.2A10	MZC8.2B10	1N4101	1N756 1N959	1N5528	1N5853A	1N5237
9.1	MZC9.1A10	MZC9.1B10	1N4103	1N757 1N960	1N5529	1N5855A	1N5239
10	MZC10A10	MZC10B10	1N4104	1N758 1N961	1N5530	1N5856A	1N5240
11	MZC11A10	MZC11B10	1N4105	1N962	1N5531	1N5857A	1N5241
12	MZC12A10	MZC12B10	1N4106	1N759 1N963	1N5532	1N5858A	1N5242
13	MZC13A10	MZC13B10	1N4107	1N964	1N5533	1N5859A	1N5243
15	MZC15A10	MZC15B10	1N4109	1N965	1N5535	1N5861A	1N5245
16	MZC16A10	MZC16B10	1N4110	1N966	1N5536	1N5862A	1N5246
18	MZC18A10	MZC18B10	1N4112	1N967	1N5538	1N5864A	1N5248
20	MZC20A10	MZC20B10	1N4114	1N968	1N5540	1N5866A	1N5250
22	MZC22A10	MZC22B10	1N4115	1N969	1N5541	1N5867A	1N5251
24	MZC24A10	MZC24B10	1N4116	1N970	1N5542	1N5868A	1N5252
27	MZC27A10	MZC27B10	1N4118	1N971		1N5870A	1N5254
30	MZC30A10	MZC30B10	1N4120	1N972	1N5545	1N5872A	1N5256
33	MZC33A10	MZC33B10	1N4121	1N973	1N5546	1N5873A	1N5257
36	MZC36A10	MZC36B10	1N4122	1N974		1N5874A	1N5258
39	MZC39A10	MZC39B10	1N4123	1N975		1N5875A	1N5259
43	MZC43A10	MZC43B10	1N4124	1N976		1N5876A	1N5260
47	MZC47A10	MZC47B10	1N4125	1N977		1N5877A	1N5261
51	MZC51A10	MZC51B10	1N4126	1N978		1N5878A	1N5262
56	MZC56A10	MZC56B10	1N4127	1N979		1N5879A	1N5263
62	MZC62A10	MZC62B10	1N4129	1N980		1N5881A	1N5265
68	MZC68A10	MZC68B10	1N4130	1N981		1N5882A	1N5266
75	MZC75A10	MZC75B10	1N4131	1N982		1N5883A	1N5267
82	MZC82A10	MZC82B10	1N4132	1N983		1N5884A	1N5268
91	MZC91A10	MZC91B10	1N4134	1N984		1N5886A	1N5270
100	MZC100A10	MZC100B10	1N4135	1N985		1N5887A	1N5271
110	MZC110A10	MZC110B10		1N986		1N5888A	1N5272
120	MZC120A10	MZC120B10		1N987		1N5889A	1N5273
130	MZC130A10	MZC130B10		1N988		1N5891A	1N5274
150	MZC150A10	MZC150B10		1N989		1N5892A	1N5276
160	MZC160A10	MZC160B10		1N990		1N5893A	1N5277
180	MZC180A10	MZC180B10		1N991		1N5895A	1N5279
200	MZC200A10	MZC200B10		1N992		1N5897A	1N5281

NOTES:

1. The Zener Voltage is measured at approximately ¼ the rated power except for the MZ4614 and 1N4099 series. This series is measured with an I_{ZT} = 250 μAdc. The 1N4370 and 1N746 series is measured with an I_{ZT} = 20 mAdc.
2. No suffix denotes ±10% tolerance. "A" suffix is ±5.0% tolerance. (1N4370-4372, 1N746-759; 1N3821-30, 1N3993-4000, 1N4728-64).
3. No suffix is ±20% tolerance; "A" suffix is ±10% tolerance, and "B" suffix is ±5.0% tolerance, (1N957-992; 1N3016-3051; 1N3785-3820; 1N2970&R-3015&R; 1N4549&R-4556&R; 1N4557&R-4564&R; 1N3305&R-3330&R; 1N5333–1N5338).

Other Standard Voltages Available:
2.5, 2.8, 6.0, 8.7, 14, 17, 19, 25, 28, 60, 87, 140, 150, and 190.

ZENER DIODES (continued)

1 WATT	1WATT	1-1/2 WATT	5 WATT	10 WATT	50 WATT		
Cathode - Polarity Mark	Cathode to Case	Cathode to Case	Cathode = Polarity Mark	Cathode to Case = 1N3993 series Anode to Case = 1N2970 series	Anode to Case		
 Surmetic 30 CASE 59 (DO-41)	 CASE 52 (DO-13)	 CASE 55	 Surmetic 40 CASE 17	 CASE 56 (DO-4)	 CASE 54 (TO-3)	 CASE 58 (DO-5)	Nominal Zener Voltage
CONSUMER INDUSTRIAL (NOTE 2)	CONSUMER INDUSTRIAL (NOTE 2, 3, 9)	INDUSTRIAL (NOTE 3)	INDUSTRIAL (NOTE 3)	INDUSTRIAL (NOTE 2, 3, 4, 10)	INDUSTRIAL (NOTE 3, 4)	INDUSTRIAL (NOTE 3, 4)	(NOTE 1, 6)
							1.8
							2.0
							2.2
							2.4
							2.7
							3.0
1N4728	1N3821		1N5333				3.3
1N4729	1N3822		1N5334				3.6
1N4730	1N3823		1N5335	1N3993&R	1N4557&R	1N4549&R	3.9
1N4731	1N3824		1N5336	1N3994&R	1N4558&R	1N4550&R	4.3
1N4732	1N3825		1N5337	1N3995&R	1N4559&R	1N4551&R	4.7
1N4733	1N3826		1N5338	1N3996&R	1N4560&R	1N4552&R	5.1
1N4734	1N3827		1N5339	1N3997&R	1N4561&R	1N4553&R	5.6
1N4735	1N3828		1N5341	1N3998&R	1N4562&R	1N4554&R	6.2
1N4736	1N3829 1N3016	1N3785	1N5342	1N3999&R 1N2970&R	1N4563&R 1N2804&R	1N4555&R 1N3305&R	6.8
1N4737	1N3830 1N3017	1N3786	1N5343	1N4000&R 1N2971&R	1N4564&R 1N2805&R	1N4556&R 1N3306&R	7.5
1N4738	1N3018	1N3787	1N5344	1N2972&R	1N2806&R	1N3307&R	8.2
1N4739	1N3019	1N3788	1N5346	1N2973&R	1N2807&R	1N3308&R	9.1
1N4740	1N3020	1N3789	1N5347	1N2974&R	1N2808&R	1N3309&R	10
1N4741	1N3021	1N3790	1N5348	1N2975&R	1N2809&R	1N3310&R	11
1N4742	1N3022	1N3791	1N5349	1N2976&R	1N2810&R	1N3311&R	12
1N4743	1N3023	1N3792	1N5350	1N2977&R	1N2811&R	1N3312&R	13
1N4744	1N3024	1N3793	1N5352	1N2979&R	1N2813&R	1N3314&R	15
1N4745	1N3025	1N3794	1N5353	1N2980&R	1N2814&R	1N3315&R	16
1N4746	1N3026	1N3795	1N5355	1N2982&R	1N2816&R	1N3317&R	18
1N4747	1N3027	1N3796	1N5357	1N2984&R	1N2818&R	1N3319&R	20
1N4748	1N3028	1N3797	1N5358	1N2985&R	1N2819&R	1N3320&R	22
1N4749	1N3029	1N3798	1N5359	1N2986&R	1N2820&R	1N3321&R	24
1N4750	1N3030	1N3799	1N5361	1N2988&R	1N2822&R	1N3323&R	27
1N4751	1N3031	1N3800	1N5363	1N2989&R	1N2823&R	1N3324&R	30
1N4752	1N3032	1N3801	1N5364	1N2990&R	1N2824&R	1N3325&R	33
1N4753	1N3033	1N3802	1N5365	1N2991&R	1N2825&R	1N3326&R	36
1N4754	1N3034	1N3803	1N5366	1N2992&R	1N2826&R	1N3327&R	39
1N4755	1N3035	1N3804	1N5367	1N2993&R	1N2827&R	1N3328&R	43
1N4756	1N3036	1N3805	1N5368	1N2996&R	1N2829&R	1N3330&R	47
1N4757	1N3037	1N3806	1N5369	1N2997&R	1N2831&R	1N3332&R	51
1N4758	1N3038	1N3807	1N5370	1N2999&R	1N2832&R	1N3334&R	56
1N4759	1N3039	1N3808	1N5372	1N3000&R	1N2833&R	1N3335&R	62
1N4760	1N3040	1N3809	1N5373	1N3001&R	1N2834&R	1N3336&R	68
1N4761	1N3041	1N3810	1N5374	1N3002&R	1N2835&R	1N3337&R	75
1N4762	1N3042	1N3811	1N5375	1N3003&R	1N2836&R	1N3338&R	82
1N4763	1N3043	1N3812	1N5377	1N3004&R	1N2837&R	1N3339&R	91
1N4764	1N3044	1N3813	1N5378	1N3005&R	1N2838&R	1N3340&R	100
1M110ZS10	1N3045	1N3814	1N5379	1N3007&R	1N2840&R	1N3342&R	110
1M120ZS10	1N3046	1N3815	1N5380	1N3008&R	1N2841&R	1N3343&R	120
1M130ZS10	1N3047	1N3816	1N5381	1N3009&R	1N2842&R	1N3344&R	130
1M150ZS10	1N3048	1N3817	1N5383	1N3011&R	1N2843&R	1N3346&R	150
1M160ZS10	1N3049	1N3818	1N5384	1N3012&R	1N2844&R	1N3347&R	160
1M180ZS10	1N3050	1N3819	1N5386	1N3014&R	1N2845&R	1N3349&R	180
1M200ZS10	1N3051	1N3820	1N5388	1N3015&R	1N2846&R	1N3350&R	200

4. R, RA &RB = Reverse Polarity Types Available.

5a. No suffix is ±10% tolerance, "A" suffix is ±10% tolerance, "B" suffix is ±5.0% tolerance.

5b. "C" suffix is ±2.0% tolerance,
"D" suffix is ±1.0% tolerance.

6. Contact your Motorola Semiconductor Representative for information on intermediate voltages and tighter tolerances.

7. For a 5, 3, 2, or 1%, change the suffix "10" to the desired tolerance.

▨ JAN/JANTX available ±5.0% only.

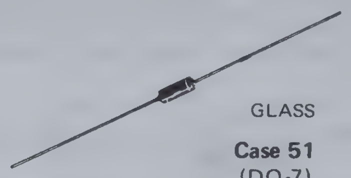
Reverse polarity available on 10W and 50W devices.

8. SIN746A to SIN973B NASA Types Available.

9. SIN3016B to SIN3051B NASA Types Available.

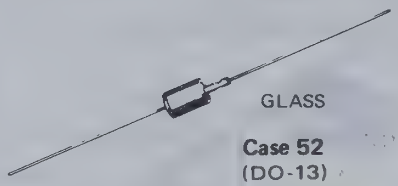
10. SIN2970B to SIN2985B and SIN2991B NASA Types Available

ZENER REFERENCE DIODES



GLASS

Case 51
(DO-7)



GLASS

Case 52
(DO-13)

For applications in which the output voltage must remain within narrow limits during changes in input voltage, load resistance, and temperature changes. These Temperature Compensated Zener Reference Diodes have low dynamic impedance and silicon oxide passivated junctions for long-term stability.

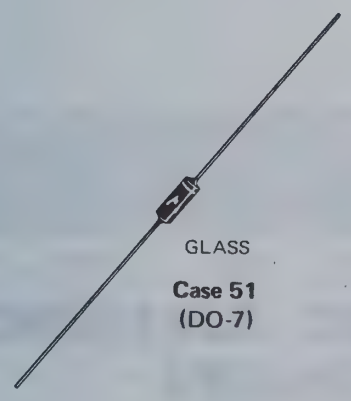
Motorola guarantees all reference diodes to fall within specified maximum voltage variations over the indicated temperature range at a specific test current. This method complies with JEDEC suggested Standard No. 5 and has been incorporated into all reference diode military specifications. Note that ratings are maximum only and do not reflect the actual voltage change exhibited by an individual unit. The temperature coefficient is shown for reference and should not be considered as a maximum rating. The reference diode temperature coefficient is not a linear characteristic, and therefore accurately reflects the voltage deviation at test temperature extremes only. Devices are tested at the various temperature points while exposed to an air environment which eliminates unwanted boundary effects prevalent in oil bath testing. Voltage-time stability, although, not specified is normally better than 100 PPM per 1000 hours of operation, however, for critical applications precision reference diodes are available with guaranteed voltage-time stability of less than 5 PPM per 1000 hours.

			AVERAGE TEMPERATURE COEFFICIENT OVER THE OPERATING TEMPERATURE RANGE												
			0.01 %/°C		0.005 %/°C		0.002 %/°C		0.001 %/°C		0.0005%/°C				
Reference Voltage	Test Current mAdc	Operating Temp. Range, °C	Device Type	ΔV_Z max Volts	Device Type	ΔV_Z max Volts	Device Type	ΔV_Z max Volts	Device Type	ΔV_Z max Volts	Device Type	ΔV_Z max Volts	Case Type
6.2 ⚠	7.5	-55, 0, +25, +75, +100	*1N821,J,TX	0.096	*1N823,J,TX	0.048	*1N825,J,TX	0.019	*1N827,J,TX	0.009	*1N829,J,TX	0.005	51
6.2 ⚠	7.5	-55, 0, +25, +75, +100	*1N821A	0.096	*1N823A	0.048	*1N825A	0.019	*1N827A	0.009	*1N829A	0.005	
6.4	0.5	0, +25, +75	1N4565	0.048	1N4566	0.024	1N4567	0.010	1N4568	0.005	1N4569	0.002	
	0.5	-55, 0, +25, +75, +100	1N4565A	0.099	1N4566A	0.050	1N4567A	0.020	1N4568A	0.010	1N4569A	0.005	
	1.0	0,+25, +75	1N4570	0.048	1N4571	0.024	1N4572	0.010	1N4573	0.005	1N4574	0.002	
	1.0	-55, 0, +25, +75, +100	1N4570A	0.099	1N4571A	0.050	1N4572A	0.020	1N4573A	0.010	1N4574A	0.005	
	2.0	0, +25, +75	1N4575	0.048	1N4576	0.024	1N4577	0.010	1N4578	0.005	1N4579	0.002	
	2.0	-55, 0, +25, +75, +100	1N4575A	0.099	1N4576A	0.050	1N4577A	0.020	1N4578A	0.010	1N4579A	0.005	
	4.0	0, +25, +75	1N4580	0.048	1N4581	0.024	1N4582	0.010	1N4583	0.005	1N4584	0.002	
	4.0	-55, 0, +25, +75, +100	1N4580A	0.099	1N4581A	0.050	1N4582A	0.020	1N4583A	0.010	1N4584A	0.005	
8.4	10.0	-55, 0, +25, +75, +100	*1N3154,J,TX	0.130	*1N3155,J,TX	0.065	*1N3156,J,TX	0.026	*1N3157,J,TX	0.013			
8.4	10.0	-55, 0, +25, +75, +100, +150	*1N3154A	0.172	*1N3155A	0.086	*1N3156A	0.034	*1N3157A	0.017			
8.5	0.5	0, +25, +75	1N4775	0.064	1N4776	0.032	1N4777	0.013	1N4778	0.006	1N4779	0.003	
	0.5	-55, 0, +25, +75, +100	1N4575A	0.132	1N4776A	0.066	1N4777A	0.026	1N4778A	0.013	1N4779A	0.007	
	1.0	0, +25, +75	1N4780	0.064	1N4781	0.032	1N4782	0.013	1N4783	0.006	1N4784	0.003	
	1.0	-55, 0, +25, +75, +100	1N4780A	0.132	1N4781A	0.066	1N4782A	0.026	1N4783A	0.013	1N4784A	0.007	
9.0	7.5	0,+25, +75	*1N935	0.067	*1N936	0.033	*1N937	0.013	*1N938	0.006	*1N939	0.003	
		-55, 0, +25, +75, +100	*1N935A	0.139	*1N936A	0.069	*1N937A	0.027	*1N938A	0.013	*1N939A	0.007	
		-55, 0, +25, +75, +100, +150	*1N935B,J,TX	0.184	*1N936B	0.092	*1N937B,J,TX	0.037	*1N938B,J,TX	0.018	*1N939B,J,TX	0.009	
9.1	0.5	0,+25, +75	1N4765	0.068	1N4766	0.034	1N4767	0.014	1N4768	0.007	1N4769	0.003	
		-55, 0, +25, +75, +100	1N4765A	0.141	1N4766A	0.070	1N4767A	0.028	1N4768A	0.014	1N4769A	0.007	
		0, +25, +75	1N4770	0.068	1N4771	0.034	1N4772	0.014	1N4773	0.007	1N4774	0.003	
		-55, 0, +25, +75, +100	1N4770A	0.141	1N4771A	0.070	1N4772A	0.028	1N4773A	0.014	1N4774A	0.007	
9.3	10.0	0, +25, +75	1N2620	0.070	1N2621	0.035	1N2622	0.014	1N2623	0.007	1N2624	0.003	52
		-55, 0, +25, +75, +100	1N2620A	0.144	1N2621A	0.072	1N2622A	0.029	1N2623A	0.014	1N2624A	0.007	
		-55, 0, +25, +75, +100, +150	1N2620B	0.191	1N2621B	0.095	1N2622B	0.038	1N2623B	0.019	1N2624B	0.010	
9.4±0.4 (Suffix "A" ±0.2 V)	10.0	0, +25, +70			1N2163,A	0.033			1N2166,A	0.007	1N2169,A	0.004	
		-55, 0, +25, +75, +125			1N2164,A	0.086			1N2167,A	0.017	1N2170,A	0.009	
		-55, 0, +, +75, +125, +185			1N2165,A	0.115			1N2168,A	0.023	1N2171,A	0.012	
11.7	7.5	0, +25, +75	*1N941	0.088	*1N942	0.044	*1N943	0.018	*1N944	0.009	*1N945	0.004	51
		-55, 0, +25, +75, +100	*1N941A	0.181	*1N942A	0.090	*1N943A	0.036	*1N944A	0.018	*1N945A	0.009	
		-55, 0, +25, +75, +100, +150	*1N941B,J,TX	0.239	*1N942B	0.120	*1N943B,J,TX	0.047	*1N944B,J,TX	0.024	*1N945B,J,TX	0.012	
11.7	7.5	0, +25, +75	1N3580	0.088	1N3581	0.044	1N3582	0.018	1N3583	0.009			52
		-55, 0, +25, +75, +100	1N3580A	0.181	1N3581A	0.090	1N3582A	0.036	1N3583A	0.018			
		-55, 0, +75, +100, +150	1N3580B	0.239	1N3581B	0.120	1N3582B	0.047	1N3583B	0.024			
12.8	0.5	+25, +75, +100	1N4896	0.096	1N4897	0.048	1N4898	0.019	1N4899	0.010			51
	0.5	-55, 0, +25, +75, +100	1N4896A	0.198	1N4897A	0.099	1N4898A	0.040	1N4899A	0.020			
	1.0	+25, +75, +100	1N4900	0.096	1N4901	0.048	1N4902	0.019	1N4903	0.010			
	1.0	-55, 0, +25, +75, +100	1N4900A	0.198	1N4901A	0.099	1N4902A	0.040	1N4903A	0.020			
	2.0	+25, +75, +100	1N4904	0.096	1N4905	0.048	1N4906	0.019	1N4907	0.010			
	2.0	-55, 0, +25, +75, +100	1N4904A	0.198	1N4905A	0.099	1N4906A	0.040	1N4907A	0.020			
	4.0	+25, +75, +100	1N4908	0.096	1N4909	0.048	1N4910	0.019	1N4911	0.010			
	4.0	-55, 0, +25, +75, +100	1N4908A	0.198	1N4909A	0.099	1N4910A	0.040	1N4911A	0.020			
	7.5	+25, +75, +100	1N4912	0.096	1N4913	0.048	1N4914	0.019	1N4915	0.010			
	7.5	-55, 0, +25, +75, +100	1N4912A	0.198	1N4913A	0.099	1N4914A	0.040	1N4915A	0.020			
19.2	0.5	+25, +75, +100	1N4916	0.144	1N4917	0.072	1N4918	0.029					51
	0.5	-55, 0, +25, +75, +100	1N4916A	0.298	1N4917A	0.149	1N4918A	0.060					
	1.0	+25, +75, +100	1N4919	0.144	1N4920	0.072	1N4921	0.029					
	1.0	-55, 0, +25, +75, +100	1N4919A	0.298	1N4920A	0.149	1N4921A	0.060					
	2.0	+25, +75, +100	1N4922	0.144	1N4923	0.072	1N4924	0.029					
	2.0	-55, 0, +25, +75, +100	1N4922A	0.298	1N4923A	0.149	1N4924A	0.060					
	4.0	+25, +75, +100	1N4925	0.144	1N4926	0.072	1N4927	0.029	1N4928	0.014			
	4.0	-55, 0, +25, +75, +100	1N4925A	0.298	1N4926A	0.149	1N4927A	0.060	1N4928A	0.030			
	7.5	+25, +75, +100	1N4929	0.144	1N4930	0.072	1N4931	0.029	1N4932	0.014			
	7.5	-55, 0, +25, +75, +100	1N4929A	0.298	1N4930A	0.149	1N4931A	0.060	1N4932A	0.030			

⚠ Non-suffix — Z_{ZT} = 15 Ω, "A Suffix — Z_{ZT} = 10 Ω

* Radiation Resistant Devices Available; to order, specify MZ821, A or B in lieu of '1N' prefix. Not Applicable to J or TX devices.

PRECISION REFERENCE DIODES



GLASS

Case 51
(DO-7)

Designed, manufactured, and tested for use in computers, inertial guidance systems, and precision equipment requiring ultra-high stability of voltage over changes of time and temperature. All precision testing equipment is housed in a double electrically shielded enclosure designed to eliminate reading errors caused by noise and interference. Equipment calibration is maintained relative to standard cells directly traceable to the National Bureau of Standards. A special power supply, having an absolute accuracy of ±0.003% is used. Voltage measurements are made in air using automated equipment having a 1.0 microvolt resolution and an overall accuracy of better than 1 PPM. This procedure negates the boundary effects problem prevalent in oil bath testing.

CERTIFIED TEST DATA

Every Motorola Precision Reference Diode is individually serialized and its test data recorded on a Certificate of Precision that accompanies the device when shipped. This data shows:

- Device voltages at each test temperature (+25, +75 and +100°C)
- Voltage stability within the measuring temperature range
- Actual device voltage at 168 hour intervals during verification test
- Voltage stability throughout the entire 1000 hour test period
- Certification of Precision
- All diodes are marked with the device type number, polarity band and serial number.

Reference Voltage Volts	Test Current MA	Temperature Stability		CERTIFIED VOLTAGE TIME STABILITY OVER 1000 HOURS OF OPERATION (Parts / Million Change)									
				<5 PPM/1000 HR		<10 PPM/1000 HR		<20 PPM/1000 HR		<40 PPM/1000 HR		<100 PPM/1000 HR	
		ΔV_Z(MV)	OP Temp Range °C	Device Type	Change µV Max	Device Type	Change µV Max	Device Type	Change µV Max	Device Type	Change µV Max	Device Type	Change µV Max
6.2±5%	7.5	2.5	25, 75, 100	MZ605	30	MZ610	60	MZ620	120	MZ640	240		
8.4±5%	10.0	3.5	25, 75, 100	MZ805	45	MZ810	90	MZ820	180	MZ840	360		
6.35±5%	7.5	2.5	25 to 100			1N4895	64	1N4893	127			1N4891 △	318
↓	↓	5.0	-55 to 100			1N4895A	64	1N4893A	127			1N4891A △	318
		5.0	25 to 100			1N4894	64	1N4892	127			1N4890 △	318
		10.0	-55 to 100			1N4894A	64	1N4892A	127			1N4890A △	318
6.2-6.5	7.5	3.0	25 to 100									1N3502	636
6.2-6.5	7.5	6.0	25 to 100					1N3504	127	1N3503	318	1N3501	636

The time stability of the MOTOROLA MZ605 series and MZ805 series is determined by the difference between any two readings taken at 168 hour intervals during the 1000—hour operating stability test. The time stability of the JEDEC registered 1N XXXX devices is determined by the difference between the zero hour reading and any subsequent measurement taken at 168 hour intervals during the 1000—hour stability test.

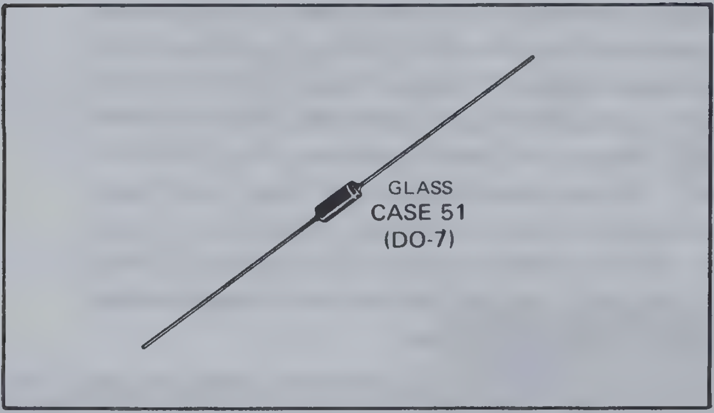
△ <50 PPM time stability on these devices

CURRENT REGULATOR DIODES

These diodes present a constant current regardless of the terminal voltage over a wide operating range and appears as a very high circuit impedance. These devices are useful for a number of electronic applications, including overcurrent protection, transistor biasing, linear ramp and stairstep generators, differential amplifiers, precision reference voltage sources, and linear-scale ohmmeters, to name a few.

Standard devices cover the range from 220 microampeıes to 4.7 milliamperes; however, higher and lower currents are available on a custom basis. Devices can be operated in series to produce an extension of the dynamic voltage range or in parallel to extend the current range. In the latter case, the resultant pinch-off current is the summation of the individual currents.

In precision circuitry applications which must operate over a significant temperature range, the temperature coefficient of each device must be thoroughly evaluated by the design engineer. For variations in current, consult the Motorola Designer's Data Sheet, 1N5283 Series. Current regulation may be improved by 1) maintaining a low anode-to-cathode voltage, thus reducing the power dissipation and. 2) reducing the junction-to-lead thermal resistance by maintaining short lead lengths, especially the cathode lead.

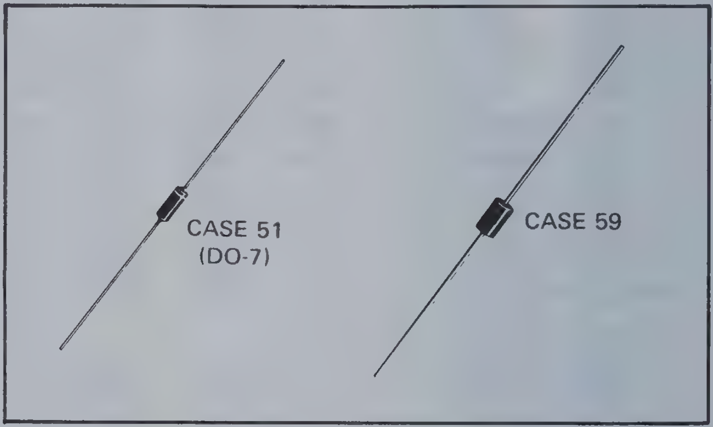


ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)
POV = 100 Volt max

Regulator Current ±10% V_T = 25 V Ip mA (nom)	Device Type	Minimum Knee Impedance @V_K = 6.0 V Z_K (MΩ)	Maximum Limiting Voltage @I_L = 0.8 Ip (min) V_L (Volts)
0.22	1N5283	2.75	1.00
0.24	1N5284	2.35	1.00
0.27	1N5285	1.95	1.00
0.30	1N5286	1.60	1.00
0.33	1N5287	1.35	1.00
0.39	1N5288	1.00	1.05
0.43	1N5289	0.870	1.05
0.47	1N5290	0.750	1.05
0.56	1N5291	0.560	1.10
0.62	1N5292	0.470	1.13
0.68	1N5293	0.400	1.15
0.75	1N5294	0.335	1.20
0.82	1N5295	0.290	1.25
0.91	1N5296	0.240	1.29
1.00	1N5297	0.205	1.35
1.10	1N5298	0.180	1.40
1.20	1N5299	0.155	1.45
1.30	1N5300	0.135	1.50
1.40	1N5301	0.115	1.55
1.50	1N5302	0.105	1.60
1.60	1N5303	0.092	1.65
1.80	1N5304	0.074	1.75
2.00	1N5305	0.061	1.85
2.20	1N5306	0.052	1.95
2.40	1N5307	0.044	2.00
2.70	1N5308	0.035	2.15
3.00	1N5309	0.029	2.25
3.30	1N5310	0.024	3.35
3.60	1N5311	0.020	2.50
3.90	1N5312	0.017	2.60
4.30	1N5313	0.014	2.75
4.70	1N5314	0.012	2.90
0.5±0.3	MCL1300	0.500	1.00
1.0±0.6	MCL1301	0.200	1.50
2.0±0.6	MCL1302	0.100	2.00
3.0±0.6	MCL1303	0.050	2.00
4.0±0.6	MCL1304	0.025	2.50

FORWARD REFERENCE DIODES

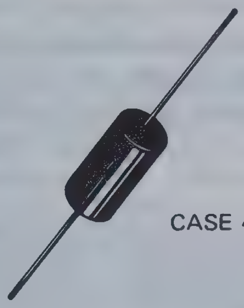
Constant voltage reference diodes designed for stable forward reference sources, transistor amplifier biasing and similar applications.

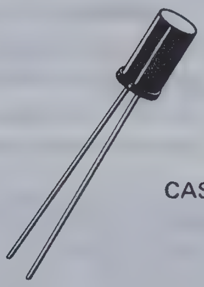


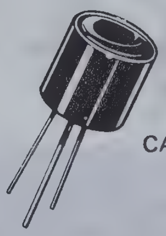
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Forward Reference Voltage		Test Current I_F(mA)	Device Type	Leakage Current I_R @ V_R		Case
Min	Max			μA	Volts	
0.63	0.71	10.0	MZ2360	10	5.0	59 Surmetic
1.24	1.38	10.0	MZ2361	10	5.0	51 Surmetic
1.90	2.10	10.0	MZ2362	10	5.0	51
0.58	0.70	1.0	.4M.64FR10	0.1	4.0	Glass
1.29	1.43	10	.4M1.36FR5	↓	↓	↓
1.33	1.39	10	.4M1.36FR2			
1.94	2.14	10	.4M2.04FR5			
2.00	2.08	10	.4M2.04FR2			
0.58	0.70	1.0	1N816			

MOLDED ASSEMBLIES


CASE 41


CASE 53


CASE 57

V_Z Volts	I_{ZT} mA	Operating Range -55 to +25°C ΔV_Z Volts	Operating Range +25 to +100°C ΔV_Z Volts	Device Type	Temp. Coeff. For Ref. %/°C	Case
12.4	10	0.050	0.047	1N4057	0.005	41-8
		0.020	0.019	1N4057A	0.002	
14.6		0.058	0.055	1N4058	0.005	
		0.023	0.022	1N4058A	0.002	
16.8		0.067	0.063	1N4059	0.005	
		0.027	0.025	1N4059A	0.002	
18.5		0.074	0.069	1N4060	0.005	
		0.030	0.028	1N4060A	0.002	
21.0		0.084	0.079	1N4061	0.005	
		0.034	0.032	1N4061A	0.002	
23.0		0.092	0.086	1N4062	0.005	
		0.037	0.035	1N4062A	0.002	
27.0		0.108	0.101	1N4063	0.005	
		0.043	0.041	1N4063A	0.002	
30.0		0.120	0.113	1N4064	0.005	
		0.048	0.045	1N4064A	0.002	
33.0		0.132	0.124	1N4065	0.005	
		0.053	0.050	1N4065A	0.002	
37.0	7.5	0.148	0.139	1N4066	0.005	
		0.059	0.056	1N4066A	0.002	
43.0		0.172	0.161	1N4067	0.005	
		0.069	0.065	1N4067A	0.002	
47.0		0.188	0.176	1N4068	0.005	
		0.075	0.071	1N4068A	0.002	
51.0		0.204	0.191	1N4069	0.005	41-9
		0.082	0.077	1N4069A	0.002	
56.0		0.224	0.210	1N4070	0.005	
		0.090	0.084	1N4070A	0.002	
62.0		0.248	0.232	1N4071	0.005	
		0.099	0.093	1N4071A	0.002	
68.0	5.0	0.272	0.255	1N4072	0.005	
		0.109	0.102	1N4072A	0.002	
75.0		0.300	0.281	1N4073	0.005	
		0.120	0.113	1N4073A	0.002	
82.0		0.328	0.307	1N4074	0.005	
		0.131	0.123	1N4074A	0.002	
87.0		0.348	0.326	1N4075	0.005	
		0.139	0.131	1N4075A	0.002	
91.0		0.364	0.341	1N4076	0.005	
		0.146	0.137	1N4076A	0.002	
100		0.400	0.375	1N4077	0.005	
		0.160	0.150	1N4077A	0.002	

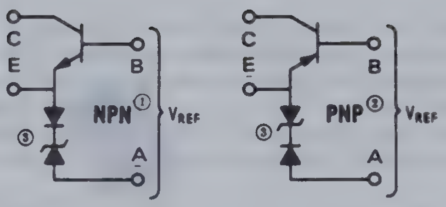
V_Z Volts	I_{ZT} mA	Operating Range -55 to +25°C ΔV_Z Volts	Operating Range +25 to +100°C ΔV_Z Volts	Device Type	Temp. Coeff. For Ref. %/°C	Case
105	2.5	0.420	0.394	1N4078	0.005	
		0.168	0.158	1N4078A	0.002	
110		0.440	0.413	1N4079	0.005	
		0.176	0.165	1N4079A	0.002	
120		0.480	0.450	1N4080	0.005	
		0.192	0.180	1N4080A	0.002	
130		0.520	0.488	1N4081	0.005	41-10
		0.208	0.195	1N4081A	0.002	
140		0.560	0.525	1N4082	0.005	
		0.224	0.210	1N4082A	0.002	
150		0.600	0.563	1N4083	0.005	
		0.240	0.225	1N4083A	0.002	
175		0.700	0.656	1N4084	0.005	
		0.280	0.263	1N4084A	0.002	
200		0.800	0.750	1N4085	0.005	
		0.320	0.300	1N4085A	0.002	

V_Z Volts	I_{ZT} mA	Temperature Range -55, +25, +100°C ΔV_Z Volts	Device Type	Temp. Coeff. For Ref. %/°C	Case
6.2	7.5	0.050	1N429(1)	0.01	53
6.2	7.5	0.050	1N1735	0.01	41-6
8.4	10	0.014	1N1530	0.002	57
8.4	10	0.007	1N1530A(1)	0.001	57
12.4	7.5	0.100	1N1736	0.01	41-3
12.4		0.050	1N1736A	0.005	41-3
18.6		0.150	1N1737	0.01	41-5
18.6		0.075	1N1737A	0.005	
24.8		0.200	1N1738	0.01	
24.8		0.100	1N1738A	0.005	
31.0		0.250	1N1739	0.01	41-4
31.0		0.125	1N1739A	0.005	
37.2		0.300	1N1740	0.01	
37.2		0.150	1N1740A	0.005	
43.4		0.350	1N1741	0.01	
43.4		0.175	1N1741A	0.005	
49.6		0.400	1N1742	0.01	
49.6		0.200	1N1742A(1)	0.005	

(1) Available as JAN devices.

REFERENCE AMPLIFIERS

CASE
212-01



1 Add Suffix N to type number for NPN devices.
2 Add Suffix P to type number for PNP devices.
3 MCA1911 Series uses only zener
diode and transistor.

. . . designed for use in regulated power supplies as a combination voltage reference element and error voltage amplifier, providing temperature compensation for excellent reference voltage stability. Available with either PNP or NPN transistors for versatility of circuit design. Operation over three different temperature ranges: 0 to 75°C, –55 to 100°C, –55 to 150°C.

Note: Basic type numbers are listed in the table; add suffix "P" or "N" to denote specific polarity.

ELECTRICAL CHARACTERISTICS (I_{ZT} = 5.0 mA, V_{CEO} = 30 V)

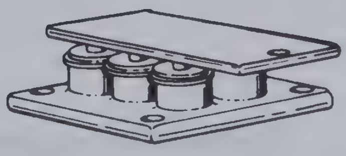
V_{REF} Volts	Tolerance ±%	Test Temperature °C	ΔV_{REF} Volts	Device Type
6.8	10	0, +25, +75	0.051	MCA1911
			0.025	MCA1912
			0.010	MCA1913
			0.005	MCA1914
	5.0	-55, 0, +25, +75, +100	0.105	MCA1921
			0.052	MCA1922
			0.020	MCA1923
			0.010	MCA1924
		-55, 0, +25, +75, +100, +150	0.139	MCA1931
			0.069	MCA1932
			0.026	MCA1933
			0.013	MCA1934
8.6	10	0,+25, +75	0.060	MCA2011
			0.030	MCA2012
			0.012	MCA2013
			0.006	MCA2014
	5.0	-55, 0, +25, +75, +100	0.124	MCA2021
			0.062	MCA2022
			0.024	MCA2023
			0.012	MCA2024
		-55, 0, +25, +75, +100, +150	0.164	MCA2031
			0.082	MCA2032
			0.032	MCA2033
			0.016	MCA2034

V_{REF} Volts	Tolerance ±%	Test Temperature °C	ΔV_{REF} Volts	Device Type
9.5	10	0, +25, +75	0.071	MCA2111
			0.035	MCA2112
			0.014	MCA2113
			0.007	MCA2114
	5.0	-55, 0, +25, +75, +100	0.147	MCA2121
			0.073	MCA2122
			0.028	MCA2123
			0.014	MCA2124
		-55, 0, +25, +75, +100, +150	0.194	MCA2131
			0.097	MCA2132
			0.038	MCA2133
			0.019	MCA2134
11	10	0, +25, +75	0.082	MCA2211
			0.041	MCA2212
			0.016	MCA2213
			0.008	MCA2214
	5.0	-55, 0, +25, +75, +100	0.170	MCA2221
			0.085	MCA2222
			0.034	MCA2223
			0.017	MCA2224
		-55, 0, +25, +75, +100, +150	0.225	MCA2231
			0.112	MCA2232
			0.044	MCA2233
			0.022	MCA2234

SILICON POWER TRANSIENT SUPPRESSORS

Power Zener diodes designed for applications requiring protection of voltage sensitive electronic devices in danger of destruction by high energy voltage transients. Individual cells are matched to insure current sharing under high current pulse conditions.

- Transient Power Dissipation: 40 kW
  Pulse Width: 0.1 ms
- DC Power Dissipation: 350 Watts @ $T_C = 25^\circ C$
  (Derate 2.33 W/°C above 25°C)
- Operating Junction and Storage Temperature
  Range: –65°C to +175°C
- Polarity: Anode-to-Case is Standard
  Cathode-to-Case Available Upon Request



Case 119

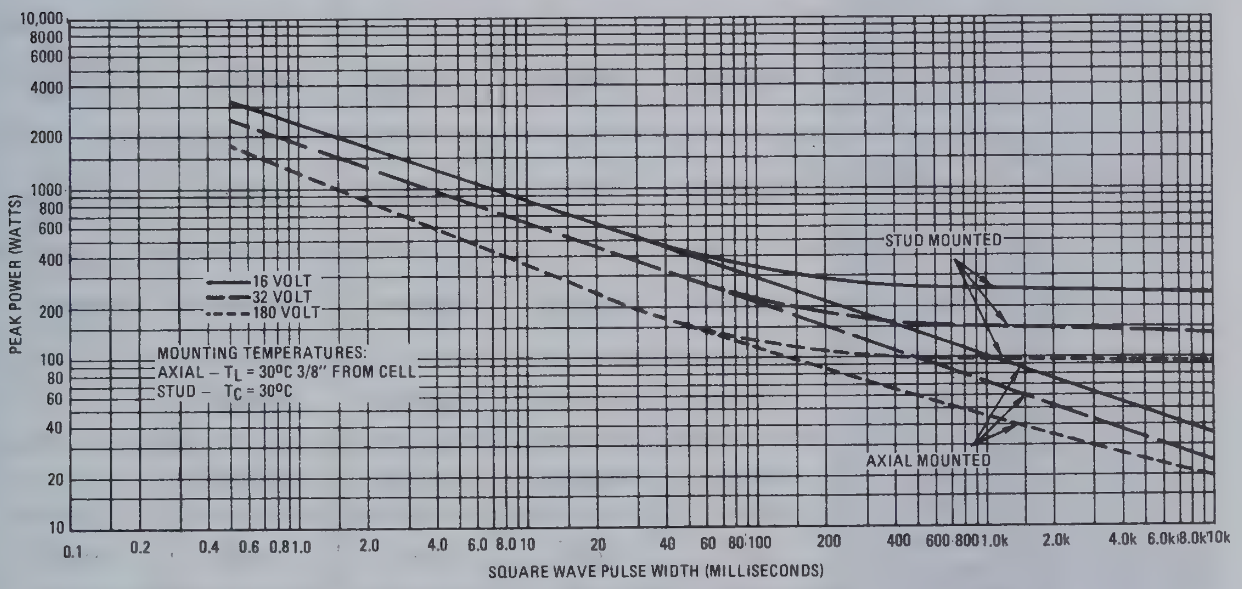
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ C$) (V_F = 1.5 V max @ 10 A for all types)

Device Type	Nominal Operating Voltage (Note 1)		Maximum Device Clamping Factor	Minimum Zener Voltage		Maximum Zener Voltage Pulse Width = 1.0 ms		Maximum Reverse Current $I_{R(max)}$ @ $V_R = V_{OP(PK)}$ μAdc	Typical Capacitance C (typ) @ $V_R = V_{OP(PK)}$ μF
	$V_{OP(PK)}$ Vdc	$V_{OP(RMS)}$ V rms	$CF = \frac{V_Z @ I_{Z(pulse)}}{V_Z @ I_{ZT}}$	$V_{Z(min)}$ Vdc @	I_{ZT} Adc	$V_{Z(max)}$ Vdc @	$I_{Z(pulse)}$ Adc		
MPZ5-16A	14	10	1.25	16	0.4	24	200	50	0.025
-16B	14	10	1.25	16	0.4	20	200		0.025
-32A	28	20	1.25	32	0.2	50	100		0.011
-32B	28	20	1.25	32	0.2	45	100		0.011
-32C	28	20	1.25	32	0.2	40	100		0.011
-180A	165	117	1.14	180	0.03	250	20		0.0012
-180B	165	117	1.14	180	0.03	225	20		0.0012
-180C	165	117	1.14	180	0.03	205	20	50	0.0012

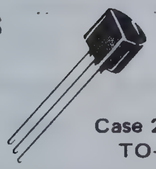
Although the MPZ Series is only offered in an array of six basic cells, special configurations are available with various power and/or voltage ratings (e.g., 1000 W dc and 200 V dc). In order to choose the correct suppressor, the determination must first be made of the energy magnitude, pulse width, and duty cycle of the transient involved. The following graph is presented to aid the design engineer in selecting the proper case outline and/or combination of basic cells suitable for his specific high-power surge applications. The data represents the surge capabilities of the basic cell (Case 60) both in an axial lead configuration and when mounted on a 7/16″ stud base. All data shown reflects the device mounted to an infinite heat sink.

Application Note, AN-461, Transient Suppression with a Power Zener Diode, is available upon request. For more information, contact your nearest Motorola Sales Office or franchised distributor.

BASIC CELL MAXIMUM NON-REPETITIVE SURGE POWER



DUAL DIODES



Case 29-01
TO-92

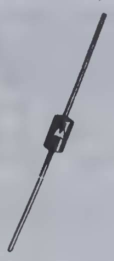
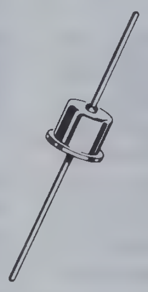
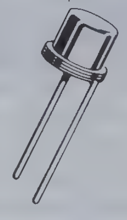
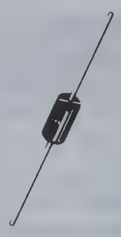
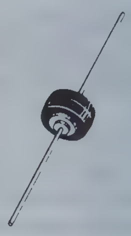
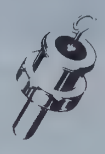
Dual diodes designed for use in low cost biasing, steering and voltage doubler applications including series, common cathode and common anode dual diodes.

Device Type	$V_{(BR)}$ @ Volts Min	$I_{(BR)}$ μA	I_R @ μA Max	V_R Volts	V_F @ Volts Min/Max	I_F mA	$C_{V_R = 0}$ pF Max	t_{rr} ns Max	Description
MSD6100	100	100	0.1	50	0.67/0.82	10	1.5	4.0	Switching
MSD6101	50	100	0.1	40	0.67/0.82	10	2.0	10	Discriminator
MSD6102	70	100	0.1	50	0.67/1.0	10	3.0	100	Common Cathode
MSD6150	70	100	0.1	50	–/1.0	10	8.0	100	Common Anode
MSD7000	100	100	0.2	50	0.67/0.82	10	1.5	15	Series

RECTIFIER DEVICES

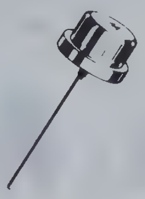
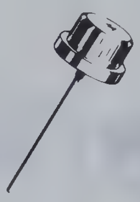
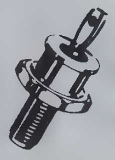
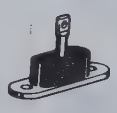
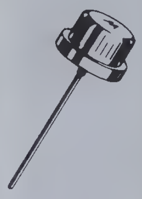
GENERAL PURPOSE RECTIFIERS

. . . offered in current ranges of 1.0 to 50 amperes and in voltages to 1000 volts. Reverse polarity (anode to case) units can be obtained by adding an 'R' suffix letter to the standard part number, e.g., 1N3988R.

I_O, AVERAGE RECTIFIED FORWARD CURRENT (Amperes)						
	1.0	3.0			6.0	12
Case V_{RRM} (Volts)	59 (DO-41) 	60 	70 	267 	194 	245 (DO-4) 
100	1N4002	1N4720	1N4998	MR501	MR751	MR1121 1N1200 1N1200A
200	1N4003	1N4721	1N4999	MR502	MR752	MR1122 1N1202 1N1202A
400	1N4004	1N4722	1N5000	MR504	MR754	MR1124 1N1204 1N1204A
600	1N4005	1N4723	1N5001	MR506	MR756	MR1126 1N1206 1N1206A
800	1N4006	1N4724	1N5002	MR508		MR1128 1N3988
1000	1N4007	1N4725	1N5003	MR510		MR1130 1N3990
I_{FSM} (Amp)	30	300	300	100	400	300
T_A @ Rated I_O (°C)	75	75	75	95	60	
T_C @ Rated I_O (°C)						150
T_{JRRM}† (°C)	175	175	175	175	175	190

†$T_{J(Max)}$

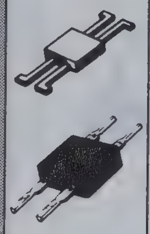
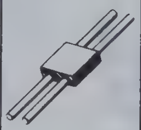
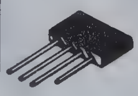
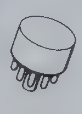
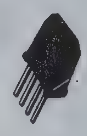
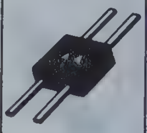
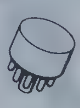
GENERAL PURPOSE RECTIFIERS (continued)

I_O, AVERAGE RECTIFIED FORWARD CURRENT (Amperes)							
15	20	25	30	35	50		
42A (DO-5)	42A (DO-5)	43 (DO-21) 	43 (DO-21) 	42A (DO-5) 	100 	43-04 	Case V_{RRM} (Volts)
1N3209	1N249B 1N1192	1N3492	1N3660	1N1184	MR1201FL	MR5010	100
1N3210	1N250B 1N1194	1N3493	1N3661	1N1186	MR1203FL	MR5020	200
1N3212	1N1196 1N1196A	1N3495	1N3663	1N1188	MR1207FL	MR5040	400
1N3214	1N1198 1N1198A 1N3214	MR328		1N1190	MR1209FL		600
		MR330					800
		MR331					1000
250	350	300	400	400	800	600	I_{FSM} (Amp)
							T_A @ Rated I_O (°C)
150	150	130	100	140	150	150	T_C @ Rated I_O (°C)
175	190	175	175	190	190	195	T_{JRRM}† (°C)

†$T_{J(Max)}$

BRIDGES
(Single-Phase Unless Noted)

. . .available in current ranges of 1.0 to 50 amperes and in voltages to 1000 volts. Reverse bridges shown are composed of general purpose rectifiers but other types are available upon request.

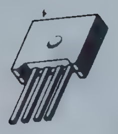
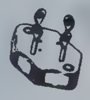
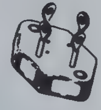
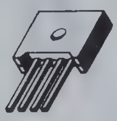
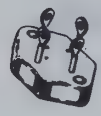
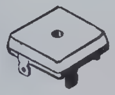
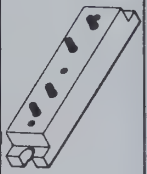
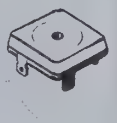
	I_O, DC OUTPUT CURRENT (Amperes)						
	1.0	1.5				1.8	4.0
Case	108, 109	110	111	112	282-01	216-01	112
V_{RRM} (Volts)	 1	 2	 2	 3	 1	 1	 3
25	MDA920-1					MDA922-1	
50	MDA920-2	MDA942-1	MDA942A-1	MDA1491-1	MDA100	MDA922-2	MDA1591-1
100	MDA920-3	MDA942-2	MDA942A-2	MDA1491-2	MDA101	MDA922-3	MDA1591-2
200	MDA920-4	MDA942-3	MDA942A-3	MDA1491-3	MDA102	MDA922-4	MDA1591-3
300	MDA920-5	MDA942-4	MDA942A-4	MDA1491-4		MDA922-5	MDA1591-4
400	MDA920-6	MDA942-5	MDA942A-5	MDA1491-5	MDA104	MDA922-6	MDA1591-5
600	MDA920-7	MDA942-6	MDA942A-6	MDA1491-6	MDA106	MDA922-7	MDA1591-6
800					MDA108	MDA922-8	
1000					MDA110	MDA922-9	
I_{FSM} (Amp)	32	25	25	25	45	60	100
T_A @ Rated I_O (°C)	75	55	55	55	55	55	55
T_C @ Rated I_O (°C)							
T_{JRRM}† (°C)	175	150	150	150	150	175	150

†$T_{J(Max)}$

1. Lead-Frame Assembly
2. Discrete Diode Assembly
3. Discrete Diode Assembly Utilizing Metal Cased Rectifiers

RECTIFIER DEVICES (continued)

BRIDGES (continued)

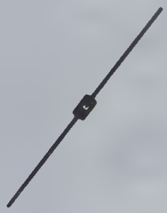
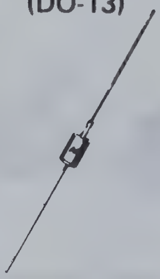
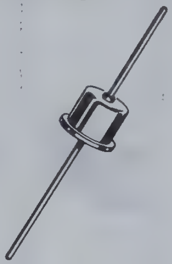
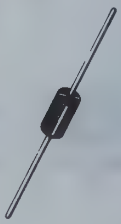
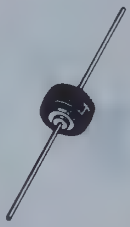
I_O, DC OUTPUT CURRENT (Amperes)								
4.0	6.0	8.0		10	12	16	30	
117	113	114 3-Phase Full-Wave Bridge	117	115	179-01	116	179-02	Case
								
1	3	3	1	3	1	1	1	V_{RRM} (Volts)
								25
MDA970-1	MDA952-1	MDA1505-1	MDA970-1	MDA962-1	MDA980-1	MDA972-1	MDA990-1	50
MDA970-2	MDA952-2	MDA1505-2	MDA970-2	MDA962-2	MDA980-2	MDA972-2	MDA990-2	100
MDA970-3	MDA952-3	MDA1505-3	MDA970-3	MDA962-3	MDA980-3	MDA972-3	MDA990-3	200
	MDA952-4	MDA1505-4		MDA962-4	MDA980-4	MDA972-4	MDA990-4	300
	MDA952-5	MDA1505-5		MDA962-5	MDA980-5	MDA972-5	MDA980-5	400
	MDA952-6	MDA1505-6		MDA962-6	MDA980-6		MDA990-6	600
								800
								1000
100	150	200	100	250	300	250	300	I_{FSM} (Amp)
25	55	55		55		55		T_A @ Rated I_O (°C)
			55		55		55	T_C @ Rated I_O (°C)
150	150	150	150	150	175	150	175	T_{JRRM}† (°C)

†$T_{J(Max)}$

1. Lead-Frame Assembly
2. Discrete Diode Assembly
3. Discrete Diode Assembly Utilizing Metal Cased Rectifiers

FAST RECOVERY RECTIFIERS

. . .available for designs requiring a power rectifier having maximum switching times ranging from 200 ns to 1.0 μs. These devices are offered in current ranges of 1.0 to 50 amperes and in voltages to 600 volts. Higher voltages are available upon request, but a necessary trade-off against switching speeds results.

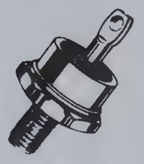
	I_O, AVERAGE RECTIFIED FORWARD CURRENT (Amperes)						
	1.0			3.0			5.0
Case / V_{RRM} (Volts)	59-01 (DO-41) 		52 (DO-13) 	60 		267-01 	194 
50	1N4933	MR810	MR1337-1	MR830	MR840	MR850	MR820
100	1N4934	MR811	MR1337-2	MR831	MR841	MR851	MR821
200	1N4935	MR812	MR1337-3	MR832	MR842	MR852	MR822
300	MR2271	MR813	MR1337-4	–	–	–	–
400	1N4936	MR814	MR1337-5	MR834	MR844	MR854	MR824
600	1N4937	MR816	–	MR836	MR846	MR856	MR826
800	–	MR817	–	–	–	–	–
1000	–	MR818	–	–	–	–	–
I_{FSM} (Amps)	30	30	30	100	100	100	300
T_A @ Rated I_O (°C)	75	75	25			90*	55*
T_C @ Rated I_O (°C)				100	100		
T_{JRRM}† (°C)	150	150	150	150	150	175	175
t_{rr} (μs)	0.2	0.75	0.2	0.2	1.0	0.2	0.2

*Must be derated for reverse power dissipation. See Data Sheet

†$T_{J(Max)}$

RECTIFIER DEVICES (continued)

FAST RECOVERY RECTIFIERS (continued)

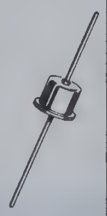
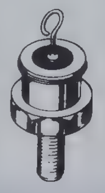
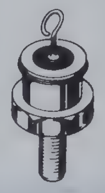
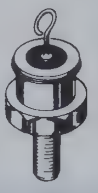
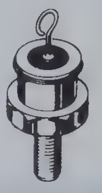
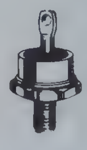
I_O, AVERAGE RECTIFIED FORWARD CURRENT (Amperes)						
6.0	12	20	30	40	50	
56-02 (DO-4) 		257 (DO-5) 				Case V_{RRM} (Volts)
1N3879	1N3889	1N3899	1N3909	MR860	MR870	50
1N3880	1N3890	1N3900	1N3910	MR861	MR871	100
1N3881	1N3891	1N3901	1N3911	MR862	MR872	200
1N3882	1N3892	1N3902	1N3912	–	–	300
1N3883	1N3893	1N3903	1N3913	MR864	MR874	400
MR1366	MR1376	MR1386	MR1396	MR866	MR876	600
–	–	–	–	–	–	800
–	–	–	–	–	–	1000
150	200	250	300	350	400	I_{FSM} (Amps)
						T_A @ Rated I_O (°C)
100	100	100	100	100	100	T_C @ Rated I_O (°C)
150	150	150	150	160	160	T_{JRRM}† (°C)
0.2	0.2	0.2	0.2	0.2	0.2	t_{rr} (μs)

*Must be derated for reverse power dissipation. See Data Sheet

†$T_{J(Max)}$

HOT CARRIER RECTIFIERS

. . .Schottky barrier devices, ideal for use in low voltage, high frequency power supplies and as free-wheeling diodes. These units feature very low forward voltages and switching times estimated at less than 10ns. They are offered in current ranges of 1.0 to 50 amperes and in voltages to 40.

I_O, AVERAGED RECTIFIED FORWARD CURRENT (AMPERES)									
	1.0	3.0	5.0	15		25		40	
Case V_{RRM} (Volts)	59 (DO-41)	60	60 	245 	245 	245 	245 	257 (DO-5) 	257 (DO-5)
20	1N5817	MBR320M	1N5823	1N5826	MBR1520	1N5829	MBR2520	1N5832	MBR4020
30	1N5818	MBR330M	1N5824	1N5827	MBR1530	1N5830	MBR2530	1N5833	MBR4030
40	1N5819	MBR340M	1N5825	1N5828	MBR1540	1N5831	MBR2540	1N5834	MBR4040
I_{FSM} (Amp)	100	500	500	500	500	800	800	800	800
‡T_C @ Rated I_O (°C)				85	80	85	80	75	70
‡T_L @ Rated I_O (°C)	90	90	80						
T_{JRRM}†	125	125	125	125	125	125	125	125	125
*Max V_F @ $I_{FM} = I_O$	0.60	45 @ 5 A	0.50	0.50	0.55	0.48	0.55	0.59	0.63

†$T_{J(Max)}$ * Values are for the 40 Volt units. The lower voltage parts provide lower limits.

‡ Must be derated for reverse power dissipation. See Data Sheet.

SPECIAL PURPOSE RECTIFIERS

. . .low-current, high-voltage diodes and stacks offered in current ranges of 250 mA to 1.0 ampere and in voltages from 1000 to 5000 volts.

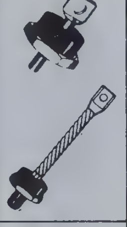
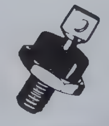
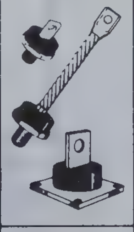
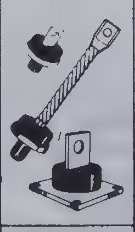
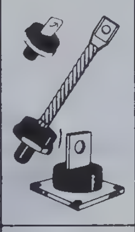
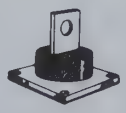
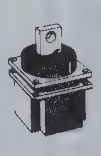
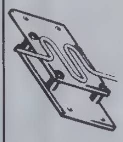
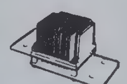
1/4 Amp. High Voltage Stacks	
Case V_{RRM} (Volts)	169
1000	MR990A
1500	MR991A
2000	MR992A
2500	MR993A
3000	MR994A
4000	MR995A
5000	MR996A
I_{FSM} (Amp)	15
T_A @ Rated I_O (°C)	75
T_{JRRM}† (°C)	150
t_{rr} (μs)	–

1.0 Amp. Television Damper Diode	
Case V_{RRM} (Volts)	59-01 (DO-41)
1200	MR1-1200
1400	MR1-1400
1600	MR1-1600
I_{FSM} (Amp)	30
T_A @ Rated I_O (°C)	75*
T_{JRRM}† (°C)	175
t_{rr} (μs)	25

†$T_{J(Max)}$ *Must be derated for reverse power dissipation. See Data Sheet

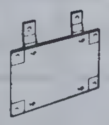
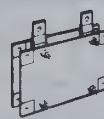
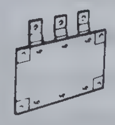
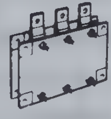
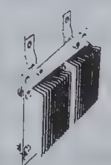
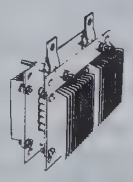
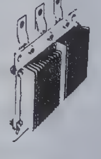
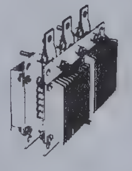
HIGH CURRENT MULTI-CELL RECTIFIER DIODES

. . .developed by Motorola to provide a reliable assembly consisting of matched rectifier diode cells. Multi-cell construction allows better thermal management with greater current handling capabilities than a single die. They are offered in current ranges from 100 to 1100 amperes and in voltages to 600 volts. Circuits as well as single rectifier elements are available.

	I_O, AVERAGE RECTIFIED FORWARD CURRENT (Amperes)								
	100		200	300	450	700	750	1000	1100
Case	167 168	189	126, 130, 133	127, 131, 134	128, 132, 135	136	159	105	158
V_{RRM} (Volts)									
100	MR1211	MR1811	MR1221	MR1231	MR1241	MR1261	MR2081HA	MR1291	MR2101HA
200	MR1213	MR1813	MR1223	MR1233	MR1243	MR1263	MR2082HA	MR1293	MR2102HA
400	MR1217	MR1817	MR1227	MR1237	MR1247	MR1267	MR2084HA	MR1297	MR2104HA
600	MR1219	MR1819	MR1229	MR1239	MR1249	MR1269	–	MR1299	–
I_{FSM} (Amp)	2000	2000	3600	5000	8000	12000	12000	18000	18000
T_C @ Rated I_O (°C)	135	135	135	135	150	150	150	150	150
T_{JRRM}† (°C)	190	190	190	190	190	190	190	190	190

†$T_{J(Max)}$

HIGH CURRENT MULTI-CELL RECTIFIER CIRCUITS

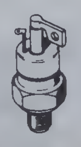
	I_O, AVERAGE RECTIFIED FORWARD CURRENT (Forced Convection at 1500 LFM)							
	300 A				600 A		650 A	
Circuit	Single-Phase Full-Wave (common cathode)	Single-Phase Bridge	Three-Phase Half-Wave (common cathode)	Three-Phase Bridge	Single-Phase Full-Wave (common cathode)	Single-Phase Bridge	Three-Phase Half-Wave (common cathode)	Three-Phase Bridge
Case	154A	155A	154A	155	156A	157A	156	157
V_{RRM} (Volts)								
50	MRA130	MRA130B	MRA330	MRA330B	MRA160	MRA160B	MRA360	MRA360B
100	MRA131	MRA131B	MRA331	MRA331B	MRA161	MRA161B	MRA361	MRA361B
200	MRA132	MRA132B	MRA332	MRA332B	MRA162	MRA162B	MRA362	MRA362B
300	MRA133	MRA133B	MRA333	MRA33B	MRA163	MRA163B	MRA363	MRA363B
400	MRA134	MRA134B	MRA334	MRA334B	MRA164	MRA164B	MRA364	MRA364B
I_{FSM} (Amps)	3000	3000	2000	2000	6000	6000	5000	5000
I_O Free Convection (Amps)	75	75	75	75	125	125	150	150
T_A @ rated I_O (1500 LFM or Free Convection) (°C)	75	75	75	75	75	75	75	75
T_{JRRM}† (°C)	150	150	150	150	150	150	150	150

†$T_{J(Max)}$

Bridge assembly is designated by the B suffix. Bridges are composed of one common anode assembly.

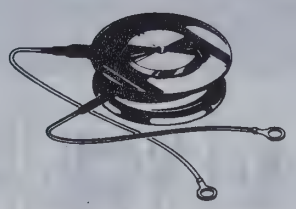
THYRISTORS DEVICES

HIGH POWER SILICON CONTROLLED RECTIFIERS

		LOW FREQUENCY SCRs				FAST SWITCHING SCRs		
								
PACKAGE		Case 219 TO-94 Style 1 Case 246* TO-83 Style 1	Case 220-01 Style 1			Case 219 TO-94 Style 1		Case 246* TO-83 Style 1
ON-STATE RMS CURRENT		110 A	235 A	380 A	470 A	110 A		
TURN-OFF TIME		–	–	–	–	10 µs	20 µs	30 µs
V_{DRM} V_{RRM} BLOCKING VOLTAGE (VOLTS)	100 V	2N4361 2N4371*	MCR235-10	MCR380-10	MCR470-10	MCR154-10 MCR156-10*	MCR155-10 MCR157-10*	MCR158-10 MCR159-10*
	200 V	2N4362 2N4372*	MCR235-20	MCR380-20	MCR470-20	MCR154-20 MCR156-20*	MCR155-20 MCR157-20*	MCR158-20 MCR159-20*
	300 V	–	MCR235-30	MCR380-30	MCR470-30	MCR154-30 MCR156-30*	MCR155-30 MCR157-30*	MCR158-30 MCR159-30*
	400 V	2N4363 2N4373*	MCR235-40	MCR380-40	MCR470-40	MCR154-40 MCR156-40*	MCR155-40 MCR157-40*	MCR158-40 MCR159-40*
	500 V	–	MCR235-50	MCR380-50	MCR470-50	MCR154-50 MCR156-50*	MCR155-50 MCR157-50*	MCR158-50 MCR159-50*
	600 V	2N4364 2N4374*	MCR235-60	MCR380-60	MCR470-60	MCR154-60 MCR156-60*	MCR155-60 MCR157-60*	MCR158-60 MCR159-60*
	700 V	–	MCR235-70	MCR380-70	MCR470-70	–	–	MCR158-70 MCR159-70*
	800 V	2N4365 2N4375*	MCR235-80	MCR380-80	MCR470-80	–	–	MCR158-80 MCR159-80*
	900 V	–	MCR235-90	MCR380-90	MCR470-90	–	–	MCR158-90 MCR159-90*
	1000 V	2N4366 2N4376*	MCR235-100	MCR380-100	MCR470-100	–	–	MCR158-100 MCR159-100*
	1100 V	–	MCR235-110	MCR380-110	MCR470-110	–	–	MCR158-110 MCR159-110*
	1200 V	2N4367 2N4377*	MCR235-120	MCR380-120	MCR470-120	–	–	MCR158-120 MCR159-120*
	1300 V	–	MCR230-130	MCR380-130	MCR470-130	–	–	–
	1400 V	2N4368 2N4378*	MCR235-140	MCR380-140	MCR470-140	–	–	–
	1500 V	–	MCR235-150	MCR380-150	MCR470-150	–	–	–

HIGH POWER SILICON CONTROLLED RECTIFIERS (continued)

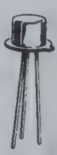
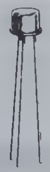
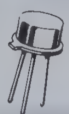
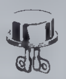
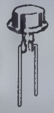
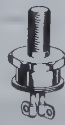
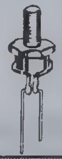
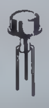
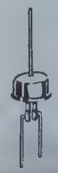
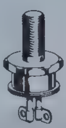
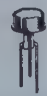
FAST SWITCHING SCRs



Case 220-01
Style 1

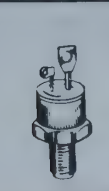
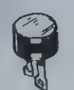
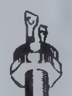
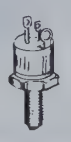
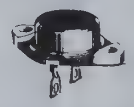
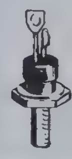
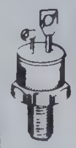
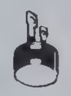
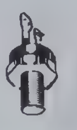
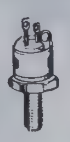
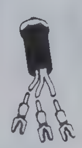
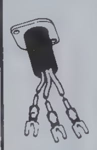
235 A			380 A			470 A			ON-STATE RMS CURRENT	
10 µs	15 µs	20 µs	15 µs	20 µs	30 µs	20 µs	30 µs	40 µs	TURN-OFF TIME	
MCR235A-10	MCR235B-10	MCR235C-10	MCR380B-10	MCR380C-10	MCR380D-10	MCR470C-10	MCR470D-10	MCR470E-10	100 V	V_{DRM} V_{RRM} BLOCKING VOLTAGE (VOLTS)
MCR235A-20	MCR235B-20	MCR235C-20	MCR380B-20	MCR380C-20	MCR380D-20	MCR470C-20	MCR470D-20	MCR470E-20	200 V	
MCR235A-30	MCR235B-30	MCR235C-30	MCR380B-30	MCR380C-30	MCR380D-30	MCR470C-30	MCR470D-30	MCR470E-30	300 V	
MCR235A-40	MCR235B-40	MCR235C-40	MCR380B-40	MCR380C-40	MCR380D-40	MCR470C-40	MCR470D-40	MCR470E-40	400 V	
MCR235A-50	MCR235B-50	MCR235C-50	MCR380B-50	MCR380C-50	MCR380D-50	MCR470C-50	MCR470D-50	MCR470E-50	500 V	
MCR235A-60	MCR235B-60	MCR235C-60	MCR380B-60	MCR380C-60	MCR380D-60	MCR470C-60	MCR470D-60	MCR470E-60	600 V	
–	MCR235B-70	MCR235C-70	MCR380B-70	MCR380C-70	MCR380D-70	MCR470C-70	MCR470D-70	MCR470E-70	700 V	
–	MCR235B-80	MCR235C-80	MCR380B-80	MCR380C-80	MCR380D-80	MCR470C-80	MCR470D-80	MCR470E-80	800 V	
–	–	MCR235C-90	–	MCR380C-90	MCR380D-90	–	MCR470D-90	MCR470E-90	900 V	
–	–	MCR235C-100		MCR380C-100	MCR380D-100	–	MCR470D-100	MCR470E-100	1000 V	
–	–	–	–	–	MCR380D-110	–	–	MCR470E-110	1100 V	
–	–	–	–	–	MCR380D-120	–	–	MCR470E-120	1200 V	
–	–	–	–	–	–	–	–	–	1300 V	
–	–	–	–	–	–	–	–	–	1400 V	
–	–	–	–	–	–	–	–	–	1500 V	

SILICON CONTROLLED RECTIFIERS
In Metal Packages

		ON-STATE (RMS) CURRENT													
		0.5 AMP	1.6 AMP			7.0 AMP		8.0 AMP							
															
		Case 22 TO-18 Style 6	Case 31 TO-5 Style 2			Case 79 TO-39 Style 3		Case 85 Style 1	Case 85L Style 1	Case 86 Style 1	Case 86L Style 1	Case 87L Style 1	Case 88L Style 1	Case 86 Style 1	Case 87L Style 1
V_{DRM} V_{RRM} BLOCKING VOLTAGE (DC OR PEAK) VOLTS	15 V	MCR201	–	–	–	–	–	–	–	–	–	–	–	–	–
	25 V	–	–	2N2322	2N4212	–	MCR320-1	2N4151	2N4159	2N4167	2N4175	2N4183	2N4191	MCR2315-1	MCR2614L-1
	30 V	MCR202	–	–	–	–	–	–	–	–	–	–	–	–	–
	50 V	–	2N1595	2N2323	2N4213	MCR32-05	MCR320-2	2N4152	2N4160	2N4168	2N4176	2N4184	2N4192	MCR2315-2	MCR2614L-2
	60 V	MCR203	–	–	–	–	–	–	–	–	–	–	–	–	–
	100 V	MCR204	2N1596	2N2324	2N4214	–	MCR320-3	2N4153	2N4161	2N4169	2N4177	2N4185	2N4193	MCR2315-3	MCR2614L-3
	150 V	MCR205	–	2N2325	2N4215	–	–	–	–	–	–	–	–		–
	200 V	MCR206	2N1597	2N2326	2N4216	MCR32-20	MCR320-4	2N4154	2N4162	2N4170	2N4178	2N4186	2N4194	MCR2315-4	MCR2614L-4
	250 V	–	–	2N2327	2N4217	–	–	–	–	–	–	–	–		–
	300 V	–	2N1598	2N2328	2N4218	MCR32-30	MCR320-5	2N4155	2N4163	2N4171	2N4179	2N4187	2N4195	MCR2315-5	MCR2614L-5
	400 V	–	2N1599	2N2329	2N4219	MCR32-40	MCR320-6	2N4156	2N4164	2N4172	2N4180	2N4188	2N4196	MCR2315-6	MCR2614L-6
	500 V	–	–	–	–	MCR32-50	MCR320-7	2N4157	2N4165	2N4173	2N4181	2N4189	2N4197	–	–
	600 V	–	–	–	–	MC 32-60	MCR320-8	2N4158	2N4166	2N4174	2N4182	2N4190	2N4198	–	–
	800 V	–	–	–	–	–	–	–	–	–	–	–	–	–	–
†ELECTRICAL CHARACTERISTICS	$I_{T(AV)}$ (Amp) @ $\alpha = 180^0$ @ T_C	0.32 @ 50°C	1.0 @ 80°C	1.0 @ 85°C	1.0 @ 80°C	4.5 @ 95°C	4.5 @ 60°C	5.0 @ 83°C	5.0 @ 83°C	5.0 @ 83°C	5.0 @ 83°C	5.0 @ 83°C	5.0 @ 83°C	5.0 @ 75°C	5.0 @ 75°C
	I_{TSM} (Amp)	6.0	15	15	15	80	80	100	100	100	100	100	100	80	80
	I^2t (A^2s)	0.15	0.5	0.5	0.5	0.15	0.15	40	40	40	40	40	40	40	40
	I_{GT} @ 25°C (mA)	0.2	10	0.2	0.1	20	20	30	30	30	30	30	30	40	40
	V_{GT} @ 25°C (V)	0.8	3.0	0.8	0.8	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	I_H @ 25°C (mA)	5.0	5.0 Typ	2.0	3.0	20	20	30	30	30	30	30	30	50	50
	t_{gt} Typ (μs)	–	0.8	–	–	–	–	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	dv/dt Typ ($V/\mu s$)	–	–	–	–	–	–	50	50	50	50	50	50	50	50

† Values for V_{GT}, I_{GT} and I_H are maximum limits unless otherwise noted.

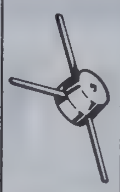
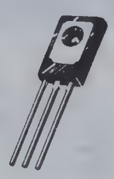
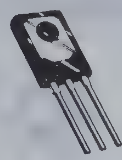
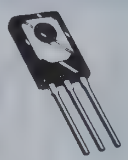
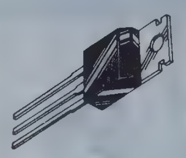
SILICON CONTROLLED RECTIFIERS (continued)

ON-STATE (RMS) CURRENT														
16 AMP	20 AMP					25 AMP		35 AMP						
														
Case 263-01 Style 1	Case 174 TO-203 Style 1	Case 175 Style 1	Case 235 Style 1	Case 61 (1) TO-41 Style 1		Case 64 Style 1	Case TO-203 Style 1	Case 174 TO-203 Style 1	Case 175 Style 1	Case 235 Style 1	Case 289-01 Style 1	Case 290-01 Style 1		
–	–	–	–	–	–	–	–	–	–	–	–	–	15 V	V_{DRM} V_{RRM} BLOCKING VOLTAGE (DC OR PEAK) VOLTS
2N1842 2N1842A	MCR3818-1 (4)	MCR3918-1 (4)	–	MCR649-1	2N2573	MCR1907-1	2N681	MCR3835-1	MCR3935-1	–	–	–	25 V	
–	–	–	–	–	–	–	–	–	–	–	–	–	30 V	
2N1843 2N1843A	2N5164 (4)	2N5168 (4)	–	MCR649-2	2N2574	MCR1907-2	2N682	MCR3835-2	MCR3935-2	–	MCR35-05	MCR36-05	50 V	
–	–	–	–	–	–	–	–	–	–	–	–	–	60 V	
2N1844 2N1844A	MCR3818-3 (4)	MCR3918-3 (4)	2N6167	MCR649-3	2N2575	MCR1907-3	2N683	2N3870 MCR3835-3	2N3896 MCR3935-3	2N6171	MCR35-10	MCR36-10	100 V	
2N1845 2N1845A	–	–	–	–	–	–	2N584	–	–	–	–	–	150 V	
2N1846 2N1846A	2N5165 (4)	2N5169 (4)	2N6168	MCR649-4	2N2576	MCR1907-4	2N685	2N3871 MCR3835-4	2N3897 MCR3935-4	2N6172	MCR35-20	MCR36-20	200 V	
2N1847 2N1847A	–	–	–	–	–	–	2N686	–	–	–	–	–	250 V	
2N1848 2N1848A	MCR3818-5 (4)	MCR3918-5 (4)	–	MCR649-5	2N2577	MCR1907-5	2N687	MCR3835-5	MCR3935-5	–	–	–	300 V	
2N1849 2N1849A	2N5166 (4)	2N5170 (4)	2N6169	MCR649-6	2N2578	MCR1907-6	2N688	2N3872 MCR3835-6	2N3898 MCR3935-6	2N6173	MCR35-40	MCR36-40	400 V	
2N1850 2N1850A	MCR3818-7 (4)	MCR3918-7 (4)	–	MCR649-7	2N2579	–	2N689	MCR3835-7	MCR3935-7	–	–	–	500 V	
–	2N5167 (4)	2N5171 (4)	2N6170	–	–	–	2N690	2N3873 MCR3835-8	2N3899 MCR3935-8	2N6174	MCR35-60	MCR36-60	600 V	
–	–	–	–	–	–	–	–	–	–	–	MCR35-80	MCR36-80	800 V	
10 @ 35°C	13 @ 67°C	13 @ 67°C	13 @ 67°C	13 @ 75°C	16 @ 85°C	16 @ 65°C	16 @ 65°C	22 @ 65°C	22 @ 65°C	22 @ 65°C	22 @ 65°C	22 @ 65°C	$I_{T(AV)}$ (Amp) @ α = 180° @ T_C	†ELECTRICAL CHARACTERISTICS
125	240	240	240	260	260	150	150	350	350	350	325	325	I_{TSM} (Amp)	
60	235	235	235	275	275	75	75	435	435	435	435	435	I^2t (A^2s)	
80	40	40	40	80	40	30	25	40	40	40	40	40	I_{GT} @ 25°C (mA)	
2.0	1.5	1.5	1.5	3.5	3.5	1.5	3.0	1.6	1.6	1.6	1.6	1.6	V_{GT} @ 25°C (V)	
20 Typ	50	50	50	20 Typ	20 Typ	12 Typ	20 Typ	50	50	50	50	50	I_H @ 25°C (mA)	
1.0	1.0	1.0	1.0	–	–	0.5	–	1.5 Max	1.5 Max	1.5 Max	–	–	t_{gt} Typ (μs)	
30	50	50	50	–	30	30 Min	30	50	50	50	50	50	dv/dt Typ (V/μs)	

(1) Available without lugs – Case 54, TO-3 (Pin) Package

(4) Standard polarity is Anode-to-Case, reverse-polarity (Cathode-to-Case) may be signified by an "R" suffix.

SILICON CONTROLLED RECTIFIERS
In Plastic Packages

		ON-STATE (RMS) CURRENT									
		0.25 AMP	0.8 AMP	4.0 AMP					8.0 AMP	12 AMP	16 AMP
											
		Case 28 Style 8	Case 29 TO-92 Style 10	Plastic Case 77-02 Style 2			Plastic Case 90-04 Style 1		Case 90-04 Style 1	Case 221-02 TO 220 AB Style 1	
V_{DRM} V_{RRM} BLOCKING VOLTAGE (DC OR PEAK) VOLTS	15 V	MCR051	MCR101	–	–	–	–	–	–	–	–
	25 V	–	–	–	–	–	–	–	MCR3000-1	–	–
	30 V	MCR052	MCR102 2N5060	2N6236	MCR106-1	MCR107-1	MCR406-1	MCR407-1	–	–	–
	50 V	–	–	2N6237	–	–	–	–	2N4441 MCR3000-2	2N6394	2N6400
	60 V	MCR053	MCR103 2N5061	–	MCR106-2	MCR107-2	MCR406-2	MCR407-2	–	–	–
	100 V	MCR054	MCR104 2N5062	2N6238	MCR106-3	MCR107-3	MCR406-3	MCR407-3	MCR3000-3	2N6395	2N6401
	150 V	–	MCR115 2N5063	–	–	–	–	–	–	–	–
	200 V	–	MCR120 2N5064	2N6239	MCR106-4	MCR107-4	MCR406-4	MCR407-4	2N4442 MCR3000-4	2N6396	2N6402
	250 V	–	–	–	–	–	–	–	–	–	–
	300 V	–	–	–	MCR106-5	MCR107-5	–	–	MCR3000-5	–	–
	400 V	–	–	2N6240	MCR106-6	MCR107-6	–	–	2N4443 MCR3000-6	2N6397	2N6403
	500 V	–	–	–	MCR106-7	MCR107-7	–	–	MCR3000-7	–	–
	600 V	–	–	2N6241	MCR106-8	–	–	–	2N4444 MCR3000-8	2N6398	2N6404
	800 V	–	–	–	–	–	–	–	–	2N6399	2N6405
†ELECTRICAL CHARACTERISTICS	$I_{T(AV)}$ (Amp) @ α 180° @ T_C	–	0.5 @ 49°C	2.6 @ 90°C	2.6 @ 90°C	2.6 @ 90°C	2.6 @ 90°C	2.6 @ 90°C	5.0 @ 73°C	7.5 @ 90°C	10 @ 100°C
	I_{TSM} (Amp) I^2t (A^2s)	6.0 0.15	6.0 0.15	25 2.6	25 2.6	25 2.6	30 3.6	20 1.6	80 25	100 40	160 100
	I_{GT} @ 25°C (mA)	0.2	0.2	0.2	0.5	20	0.2	0.5	30	30	30
	V_{GT} @ 25°C (V)	0.8	0.8	0.8	1.0	1.5	0.8	1.0	1.5	1.5	1.5
	I_H @ 25°C (mA)	5.0	5.0	3.0	5.0	20	3.0	5.0	4.0	40	40
	t_{gt} Typ (µs)	–	–	1.2	–	–	–	–	1.0	1.0	1.0
	dv/dt Typ (V/µs)	–	–	10	10	10	10	10	50	50	50

† Values for V_{GT}, I_{GT} and I_H are maximum limits unless otherwise noted.

SPECIAL-PURPOSE SCRs

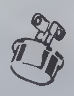
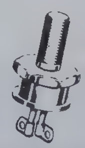
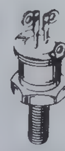
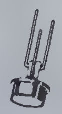
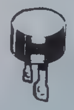
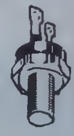
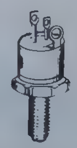
		LIGHT ACTIVATED SCRs		CAPACITIVE DISCHARGE IGNITION SYSTEM SCRs	FAST SWITCHING PULSE MODULATOR SCRs			
		ON-STATE (RMS) CURRENT			ON-STATE PULSE CURRENT			
		0.25 AMP	0.4 AMP	7.0 AMP	100 AMP		300 AMP	1000 AMP
		Case 29 TO-92 Style 19	Case 62 TO-18 Style 2	Case 79 TO-39 Style 3	Case 63 Style 1			Case 64 TO-48 Style 2
VDRM BLOCKING VOLTAGE (DC OR PEAK) VOLTS	15 V	MLS101	MLS201	–	–	–	–	–
	25 V	–	–	–	–	MCR846-1	–	–
	30 V	MLS102	MLS202	–	–	–	–	–
	50 V	–	–	MCR39-05	–	MCR846-2	–	–
	60 V	MLS103	MLS203	–	–	–	–	–
	100 V	MLS104	MLS204	–	–	MCR846-3	–	–
	150 V	–	–	–	–	–	–	–
	200 V	MLS105	MLS205	MCR39-20	–	MCR846-4	–	–
	250 V	–	–	–	–	–	–	–
	300 V	–	–	MCR39-30	2N4199 2N4199JAN	–	MCR1336-5	MCR1718-5
	400 V	–	–	MCR39-40	2N4200 2N4200JAN	–	MCR1336-6	MCR1718-6
	500 V	–	–	MCR39-50	2N4201 2N4201JAN	–	MCR1336-7	MCR1718-7
	600 V	–	–	MCR39-60	2N4202 2N4202JAN (2) (3)	–	MCR1336-8 (2) (3)	MCR1718-8
†ELECTRICAL CHARACTERISTICS	I_{TSM} (Amp)	5.0	5.0	180	–	–	–	–
	I^2t (A^2s)	–	–	–	–	35	–	250
	I_{GT} @ 25°C (mA)	0.1	0.1	15	50	50	40	50
	V_{GT} @ 25°C (V)	0.8	0.8	1.25	1.5	1.5	1.25	1.5
	I_H @ 25°C (mA)	2.0	2.0	–	3.0 Min	25 Typ	50	15 Typ
	t_{gt} Typ (μs)	–	–	–	0.4 Max	0.5	0.15	–
	dv/dt Typ (V/μs)	–	–	50 Min	250 Min	50 Min	250 Min	100
	H_{ET} (mW/cm²)	50	20	–	–	–	–	–

(2) 700V – 2N4203, 2N4203JAN and MCR1336-9 Available

(3) 800V – 2N4204, 2N4204JAN, and MCR1336-10 Available

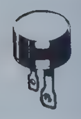
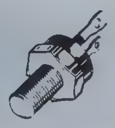
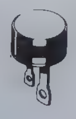
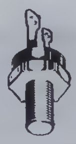
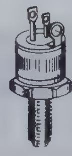
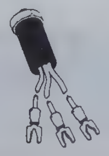
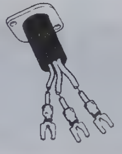
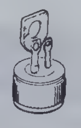
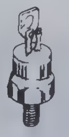
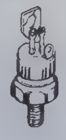
† Values for V_{GT}, I_{GT} and I_H are maximum limits unless otherwise noted.

TRIACS – SILICON BIDIRECTIONAL THYRISTORS
In Metal Packages

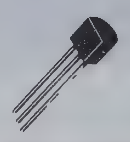
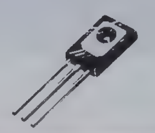
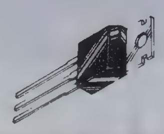
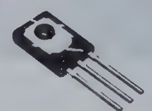
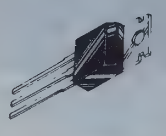
		ON-STATE (RMS) CURRENT											
		10 AMP									15 AMP		
													
		Case 85 Style 2		Case 86 Style 2			Case 250 Style 2	Case 87L Style 2			Case 174 TO-203 Style 3	Case 175 Style 3	Case 235 Style 2
V_{DRM} V_{RRM} BLOCKING VOLTAGE (DC OR PEAK) VOLTS	25 V	MAC1-1	MAC4-1	MAC5-1	–	MAC2-1	–	–	MAC3-1	MAC6-1	–	–	–
	50 V	MAC1-2	MAC4-2	MAC5-2	–	MAC2-2	–	–	MAC3-2	MAC6-2	–	–	–
	100 V	MAC1-3	MAC4-3	MAC5-3	–	MAC2-3	–	–	MAC3-3	MAC6-3	–	–	–
	200 V	MAC1-4	MAC4-4	MAC5-4	2N6139	–	2N6142	2N6148	–	MAC6-4	2N5571	2N5573	2N6145
	300 V	MAC1-5	MAC4-5	MAC5-5	–	–	–	–	–	MAC6-5	–	–	–
	400 V	MAC1-6	MAC4-6	MAC5-6	2N6140	–	2N6143	2N6149	–	MAC6-6	2N5572	2N5574	2N6146
	500 V	MAC1-7	MAC4-7	MAC5-7	–	–	–	–	–	MAC6-7	–	–	–
	600 V	MAC1-8	MAC4-8	MAC5-8	2N6141	–	2N6144	2N6150	–	MAC6-8	MAC40797	MAC40798	2N6147
	800 V	–	–	–	–	–	–	–	–	–	–	–	–
†ELECTRICAL CHARACTERISTICS	I_{GT} @ 25°C (mA)												
	MT2(+), G(+)	40	50	50	50	40	50	50	40	50	50	50	50
	MT2(+), G(–)	40	–	–	75	40	75	75	40	–	80	80	80
	MT2(–), G(–)	40	50	50	50	40	50	50	40	50	50	50	50
	MT2(–), G(+)	40	–	–	75	40	75	75	40	–	80	80	80
	V_{GT} @ 25°C (V)												
	MT2(+), G(+)	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
	MT2(+), G(–)	2.0	–	–	2.5	2.0	2.5	2.5	2.0	–	2.5	2.5	2.5
	MT2(–), G(–)	2.0	2.5	2.5	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5
	MT2(–), G(+)	2.0	–	–	2.5	2.0	2.5	2.5	2.0	–	2.5	2.5	2.5
	I_{TSM} (Amp)	100	100	100	100	100	100	100	100	100	100	100	100

†Values for V_{GT} and I_{GT} are maximum limits.

TRIACS – SILICON BIDIRECTIONAL THYRISTORS (continued)

25 AMP				30 AMP							40 AMP			
														
Case 174 TO-203 Style 3		Case 175 Style 3		Case 174 TO-203 Style 3	Case 175 Style 3	Case 235 Style 2	Case 289-01 Style 2		Case 290-01 Style 2		Case 237 Style 2	Case 238 Style 2	Case 239 Style 2	
MAC35-1	MAC37-1	MAC36-1	MAC38-1	–	–	–	–	–	–	–	–	–	–	25 V
MAC35-2	MAC37-2	MAC36-2	MAC38-2	–	–	–	MAC30-05	MAC30A-05	MAC31-05	MAC31A-05	–	–	–	50 V
MAC35-3	MAC37-3	MAC36-3	MAC38-3	–	–	–	MAC30-10	MAC30A-10	MAC31-10	MAC31A-10	–	–	–	100 V
–	MAC37-4	–	MAC38-4	2N6157	2N6160	2N6163	MAC30-20	MAC30A-20	MAC31-20	MAC31A-20	2N5441	2N5444	MAC40688	200 V
–	MAC37-5	–	MAC38-5	–	–	–	–	–	–	–	–	–	–	300 V
–	MAC37-6	–	MAC38-6	2N6158	2N6161	2N6164	MAC30-40	MAC30A-40	MAC31-40	MAC31A-40	2N5442	2N5445	MAC40689	400 V
–	MAC37-7	–	MAC38-7	–	–	–	–	–	–	–	–	–	–	500 V
–	–	–	–	2N6159	2N6162	2N6165	MAC30-60	MAC30A-60	MAC31-60	MAC31A-60	2N5443	2N5446	MAC40690	600 V
–	–	–	–	–	–	–	MAC30-80	MAC30A-80	MAC31-80	MAC31A-80	–	–	–	800 V
75 100 75 100	75 – 75 –	75 100 75 100	75 – 75 –	60 70 70 100	60 70 70 100	60 70 70 100	50 – 50 –	50 70 50 70	50 – 50 –	50 70 50 70	70 70 70 100	70 70 70 100	70 70 70 100	I_{GT}
3.0 3.0 3.0 3.0	3.0 – 3.0 –	3.0 3.0 3.0 3.0	3.0 – 3.0 –	2.0 2.1 2.1 2.5	2.0 2.1 2.1 2.5	2.0 2.1 2.1 2.5	2.0 – 2.0 –	2.0 2.5 2.0 2.5	2.0 – 2.0 –	2.0 2.5 2.0 2.5	2.0 2.0 2.0 2.5	2.0 2.0 2.0 2.5	2.0 2.0 2.0 2.5	V_{GT}
225	225	225	225	250	250	250	300	300	300	300	300	300	300	I_{TSM}

TRIACS — SILICON BIDIRECTIONAL THYRISTORS
In Plastic Packages

		ON-STATE (RMS) CURRENT										
		0.45 AMP	0.65 AMP	4.0 AMP			8.0 AMP		10 AMP		12 AMP	
												
		Case 29-02 TO-92 Style 12		Case 77 Style 5			Case 221-02 TO-220 AB Style 2		Case 90 Style 4		Cast 221-02 TO-220 AB Style 2	
V_{DRM} V_{RRM} BLOCKING VOLTAGE (DC OR PEAK) VOLTS	25 V	–	–	2N6068	2N6068A	2N6068B	–	–	MAC11-1	MAC10-1	–	–
	30 V	MAC92-1 MAC92A-1*	MAC93-1 MAC93A-1*	–	–	–	–	–	–	–	–	–
	50 V	–	–	2N6069	2N6069A	2N6069B	–	–	MAC11-2	MAC10-2	–	–
	60 V	MAC92-2 MAC92A-2*	MAC93-2 MAC93A-2*	–	–	–	–	–	–	–	–	–
	100 V	MAC92-3 MAC92A-3*	MAC93-3 MAC93A-3*	2N6070	2N6070A	2N6070B	-	–	MAC11-3	MAC10-3	–	–
	200 V	MAC92-4 MAC92A-4*	MAC93-4 MAC93A-4*	2N6071	2N6071A	2N6071B	2N6342	2N6346	2N6154 MAC11-4	2N6151 MAC10-4	2N6342A	2N6346A
	300 V	MAC92-5 MAC92A-5*	–	2N6072	2N6072A	2N6072B	–	–	MAC11-5	MAC10-5	–	–
	400 V	MAC92-6 MAC92A-6*	–	2N6073	2N6073A	2N6073B	2N6343	2N6347	2N6155 MAC11-6	2N6152 MAC10-6	2N6343A	2N6347A
	500 V	–	–	2N6074	2N6074A	2N6074B	–	–	MAC11-7	MAC10-7	–	–
	600 V	–	–	2N6075	2N6075A	2N6075B	2N6344	2N6348	2N6156 MAC11-8	2N6153 MAC10-8	2N6344A	2N6348A
	800 V	–	–	–	–	–	2N6345	2N6349	–	–	2N6345A	2N6349A
ELECTRICAL CHARACTERISTICS	I_{GT} @ 25°C (mA) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–) MT2(–), G(+)	 5.0 15* 5.0 15*	 5.0 12* 5.0 12*	 30 – 30 –	 5.0 5.0 5.0 10	 3.0 3.0 3.0 5.0	 50 – 50 –	 50 75 50 75	 50 – 50 –	 50 75 50 75	 50 – 50 –	 50 75 50 75
	V_{GT} @ 25°C (V) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–) MT2(–), G(+)	 2.0 2.0* 2.0 2.0*	 2.0 2.0* 2.0 2.0*	@ -40°C 2.5 – 2.5 –	@ -40°C 2.5 2.5 2.5 2.5	@ -40°C 2.5 2.5 2.5 2.5	 2.0 – 2.0 –	 2.0 2.5 2.0 2.5	 2.0 – 2.0 –	 .2.0 2.5 2.0 2.5	 2.0 – 2.0 –	 2.0 2.5 2.0 2.5
I_{TSM} (Amp)		6.0	6.0	30	30	30	100	100	100	100	120	120

*Denotes A Version

†Values for V_{GT} and I_{GT} are maximum limits.

UNIJUNCTION TRANSISTORS

Motorola Unijunction Transistors give you state-of-the-art leadership in technology and performance because

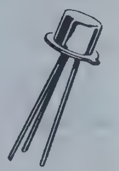
. . .the Annular process furnishes fast-response, long-time-delay advantage as well as superior reliability and stability in all applications.

. . .there are over 30 different metal and plastic Motorola UJTs to meet your top performance need in most any design from consumer to military.

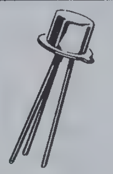
. . .computerized testing ensures uniform results, faster deliveries and user confidence.

. . .ready availability meets any demand.

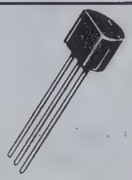
. . .applications assistance is yours for the asking, like AN-294, "Unijunction Transistor Timers and Oscillators," a valuable application note we'll send you.



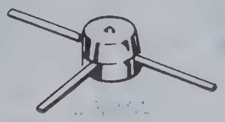
Case 22 (TO-18)



Case 22A



Plastic Case 29 (TO-92)



Case 28

UNIJUNCTION TRANSISTORS – UJT

Device Type	Case No./ Style	η Intrinsic Standoff Ratio (Min)	Max	Ip Peak Point Emitter Current µA Max	I_{EB2O} Emitter Reverse Current µA Max	I_V Valley Point Current mA Min	V_{B2B1} Interbase Voltage Volts Max	P_D Power Dissipation mW Max
MU10	29/9	0.50	0.85	5.0	1.0	1.0	35	300
2N4870	↓	0.56	0.75	5.0	1.0	2.0	35	↓
2N4871	↓	0.70	0.85	5.0	1.0	4.0	35	↓
MU4891	↓	0.55	0.82	5.0	0.01	2.0	–	↓
MU4892	↓	0.51	0.69	2.0	↓	↓	-	↓
MU4893	↓	0.55	0.82	2.0	↓	↓	–	↓
MU4894	↓	0.74	0.86	1.0	↓	↓	-	↓
MU851	28/7	0.56	0.75	2.0	0.1	2.0	28	200
MU852	↓	0.70	0.85	2.0	0.1	4.0	↓	200
MU853	↓	0.70	0.85	0.4	0.05	4.0	↓	200
MU20	22A/1	0.56	0.85	2.0	0.2	1.0	35	300
2N2646	↓	0.56	0.75	5.0	12	4.0	35	300
2N2647	↓	0.68	0.82	2.0	0.2	8.0	↓	300
2N3980	↓	0.68	0.82	2.0	0.01	1.0	↓	360
2N4851	↓	0.56	0.75	2.0	0.1	2.0	↓	300
2N4852	↓	0.70	0.85	2.0	0.1	4.0	↓	300
2N4853	↓	0.70	0.85	0.4	0.05	6.0	↓	300
2N4948	↓	0.55	0.82	2.0	0.01	2.0	–	360
JAN2N4948 (1)	↓	0.55	0.82	2.0	↓	↓	-	↓
2N4949	↓	0.74	0.86	1.0	↓	↓	–	↓
JAN2N4949 (1)	↓	0.74	0.86	1.0	↓	↓	–	↓
2N5431	↓	0.72	0.80	0.4	↓	↓	35	300
JAN2N5431 (2)	↓	0.72	0.80	0.4	↓	↓	35	300

COMPLEMENTARY UNIJUNCTION TRANSISTORS – CUJT

Device Type	Case No./ Style	η Intrinsic Standoff Ratio Min	Max	Ip Peak Point Emitter Current µA Max	I_{EB2O} Emitter Reverse Current nA Max	I_V Valley Point Current mA Min	V_{B2B1} Interbase Voltage Volts Max	P_D Power Dissipation mW Max
2N6114	22A/1	0.58	0.62	5.0	10	1.0	30	300
2N6115	22A/1	0.58	0.62	15	100	1.0	30	300

PROGRAMMABLE UNIJUNCTION TRANSISTORS – PUT

Device Type	Case No./ Style	Ip Peak Current R_G = 10 kΩ µA Max	R_G = 1.0 MΩ µA Max	I_{GAO} Leakage Current @ 40 V nA Max	I_V Valley Current R_G = 10 kΩ µA Min	R_G = 1.0 MΩ µA Max	R_G = 200 Ω mA (Min)	P_D mW	V_O Output Voltage Volts Min	V_F Forward Voltage V_F @ I_F Volts	mA	I_T DC Anode Current mA Max	I_T(pulse) Peak Anode Current 20 µs 1.0% DC Amp Max	t_r Pulse Rate of Rise ns	T_J Operating Junction Temp. Range °C
2N6027	29/16	5.0	2.0	10	70	50	1.5	375	6.0	1.5	50	200	5.0	80	50 to +100
2N6028	↓	1.0	0.15	↓	25	25	1.0	↓	↓	↓	↓	↓	↓	↓	
MPU6027	↓	5.0	2.0	↓	70	50	--	↓	↓	↓	↓	↓	↓	↓	–50 to +100
MPU6028	↓	1.0	0.15	↓	25	25	–	↓	↓	↓	↓	↓	↓	↓	
MPU131	29/10	5.0	2.0	5.0	70	50	–	↓	↓	↓	↓	↓	2.0	↓	
MPU132	29/10	2.0	0.3	5.0	50	50	–	↓	↓	↓	↓	↓	↓	↓	50 to +100
MPU133	29/10	1.0	0.15	5.0	50	25	–	↓	↓	↓	↓	↓	↓	↓	
2N6116	22/6	5.0	2.0	5.0	70	50	–	250	↓	↓	↓	↓	↓	↓	-50 to +125
2N6117	22/6	2.0	0.3	5.0	50	50	–	250	↓	↓	↓	↓	↓	↓	
2N6118	22/6	1.0	0.15	5.0	50	25		250	↓	↓	↓	↓	↓	↓	

Gate to Cathode Forward Voltage (V_{GKF}) = 40 V Max.

(1) Meets the Requirements of MIL-S-19500/388

(2) Meets the Requirements of MIL-S-19500/425

TRIGGER DEVICES

The ideal SCR or Triac complement is a trigger developed to meet design and cost considerations.

Motorola has the broadest line of signal triggers!

New unilateral switches for SCR triggering, bilateral switches for Triac control – there are more than 3 dozen signal thyristor devices available that enable the right metal or plastic device to be selected for any thyristor power control application.

CASE 22 (TO-18)	CASE 29 (TO-92)	CASE 51 (DO-7)	CASE 182

SILICON BIDIRECTIONAL SWITCH – SBS

Device Type	Case No./ Style	V_S Switching Voltage Vdc Min	Max	I_S Switching Current µAdc Max	I_H Holding Current mAdc Max	$\lvert V_{S1} - V_{S2} \rvert$ Switching Voltage Differential Vdc Max	V_F ON-State Voltage (1) I_F = 175 mAdc (2) I_F = 200 mAdc Volts Max
MBS4991	29-02/12	6.0	10	500	1.5	0.5	1.7 (1)
MBS4992	29-02/12	7.5	9.0	120	0.5	0.2	1.7 (2)
2N4993	22/9	6.0	10	500	1.5	0.5	1.7 (2)
MBS100	29-02/12	3.0	5.0	400	1.0	0.350	2.0 (2)

SILICON UNIDIRECTIONAL SWITCH – SUS

Device Type	Case No./ Style	V_S Switching Voltage Volts Min	Max	I_S Switching Current µA Max	I_H Holding Current mA Max	V_F Forward Voltage I_F = 150 mA	I_B Forward Blocking Current @ 5.0V µA	P_D Power Dissipation mW	V_R Reverse Voltage Volts Max	V_O Peak Pulse Voltage Volts Min	$I_{F(rep)}$ Peak Recurrent Forward Current T_A = 100 °C, tp = 10 µs 1.0% duty cycle Amp
MUS4987	29-02/16	6.0	10	500	1.5	1.5	0.1	300	30	3.5	2.0
MUS4988	29-02/16	7.5	9.0	150	0.5	1.5	0.1	300	30	3.5	2.0

TRIGGER DEVICES (continued)

4-LAYER DIODES (I_F = 150 mAdc Max)

Device Type	Case No.	V_S Switching Voltage Volts Min	V_S Switching Voltage Volts Max	I_S Switching Current µA Max	I_H Holding Current mA Min	I_H Holding Current mA Max	I_{pulse} Peak Pulse Current @ 50 µs Amp Max
1N5158 (M4L3052)	51	8.0	10	50	1.0	20	10
1N5159 (M4L3053)	↓	9.0	11	↓	↓	↓	↓
1N5160 (M4L3054)	↓	10	12	↓	↓	↓	↓
1N5779 (M4L3055)	↓	11	13	↓	↓	↓	↓
1N5780 (M4L3056)	↓	12	14	↓	↓	↓	↓
1N5781	↓	13	15	↓	↓	↓	↓
1N5782	↓	8.0	10	100	10	50	↓
1N5783	↓	9.0	11	↓	↓	↓	↓
1N5784	↓	10	12	↓	↓	↓	↓
1N5785	↓	11	13	↓	↓	↓	↓
1N5786	↓	12	14	↓	↓	↓	↓
1N5787	↓	13	15	↓	↓	↓	↓
1N5788	↓	8.0	10	↓	0.1	2.0	↓
1N5789	↓	9.0	11	↓	↓	↓	↓
1N5790	↓	10	12	↓	↓	↓	↓
1N5791	↓	11	13	↓	↓	↓	↓
1N5792	↓	12	14	↓	↓	↓	↓
1N5793	↓	13	15	↓	↓	↓	↓

BILATERAL TRIGGER DIACS

Device Type	Case No.	V_S Switching Voltage (Both Directions) Volts Nom	I_S Switching Current (Both Directions) µA Max	ΔV Switchback Voltage (Both Directions) Volts Min	I_B Leakage Current (Both Directions) V = 14 V µA Max	I_{pulse} Peak Pulse Current @ 30 µs, 120 Hz Amp Max
1N5758/MPT20	182-01/3	20 ± 4.0	100	5.0	10	2.0
1N5759	↓	24 ± 4.0	100	5.0	↓	↓
1N5760/MPT28	↓	28 ± 4.0	100	7.0	↓	↓
1N5761/MPT32	↓	32 ± 4.0	100	7.0	↓	↓
1N5762	↓	36 ± 4.0	100	7.0	↓	↓
1N5758A	↓	20 ± 2.0	25	5.0	↓	↓
1N5759A	↓	24 ± 2.0	25	5.0	↓	↓
1N5760A	↓	28 ± 2.0	25	7.0	↓	↓
1N5761A	↓	32 ± 2.0	25	7.0	↓	↓
1N5762A	↓	36 ± 2.0	25	7.0	↓	↓

FIELD-EFFECT TRANSISTORS

Motorola offers a line of field-effect transistors encompassing the latest technology and covering the entire gamut of potential applications. Included is a wide varietv of junction FETs and MOSFETs, with N (single gate or dual gate) or P-channel polarity. These FETs include devices optimized for operation from dc to UHF in switching and amplifying applications.

Moreover, an exclusive silicon-nitride passivation process now being employed on all Motorola MOSFETs has greatly improved MOSFET threshold stability with aging and temperature change. This process also reduces susceptibility to damage from static-charge buildup during handling because of its increased voltage breakdown capability. All Motorola single-gate MOSFETs have transient gate breakdown voltages of greater than ±150 Vdc peak (typical).

The selection tables in this guide are designed to permit a rapid selection of specific field-effect transistors for a variety of applications.

Six tables cover the major application categories:

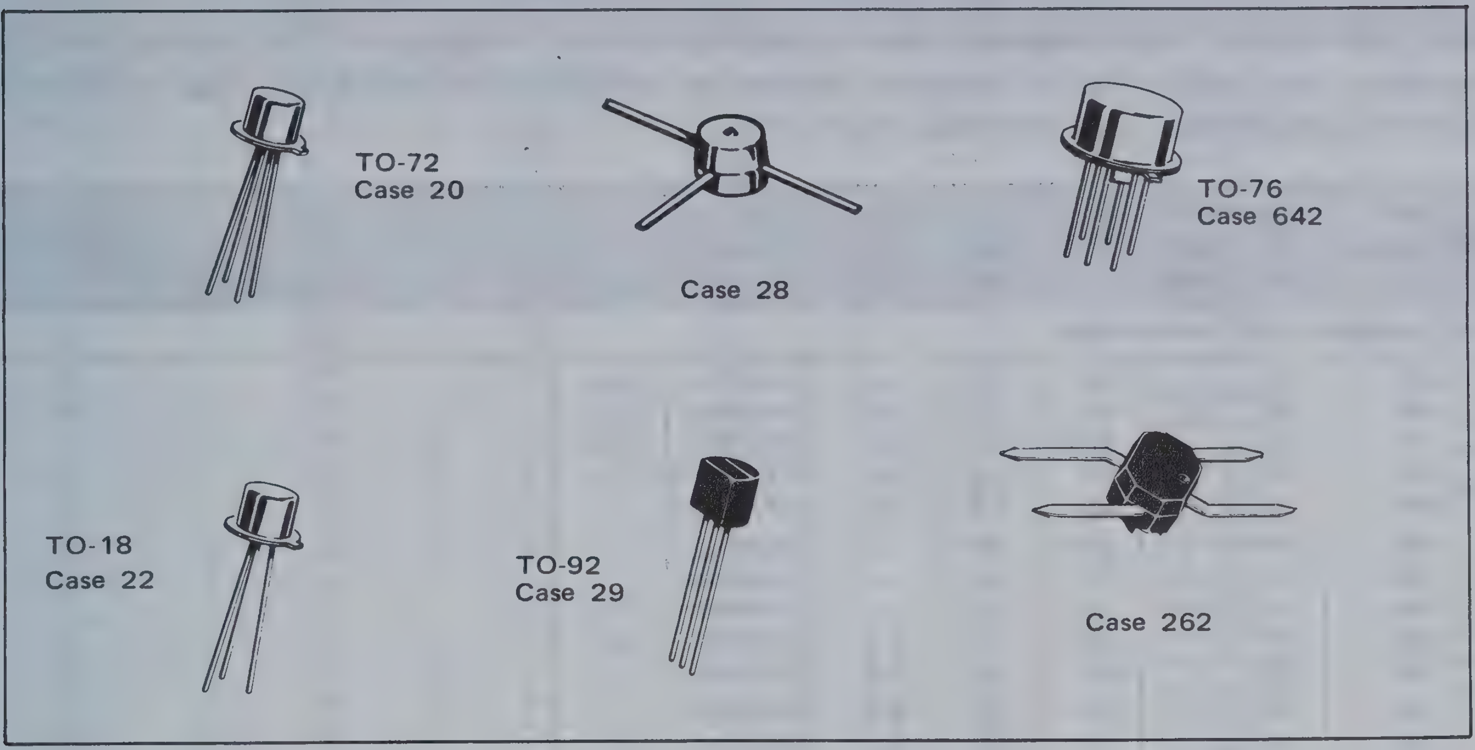
RF Amplifiers and Mixers **Table 1** . . . high performance single and dual gate devices specifically designed for RF applications	**General-Purpose Switches** **Table 4** . . . these devices are suitable for medium-speed switching applications.
Choppers **Table 2** . . . FETs have no offset voltage, and as a result, they are particularly well suited for chopper applications.	**Matched Pairs** **Table 5** . . . pairs of carefully matched devices for critical applications such as differential-amplifier service.
General-Purpose Amplifiers **Table 3** . . . N- and P-channel field-effect transistors designed for small-signal amplification at low and moderate frequencies (to 30 MHz).	**Micro-T Field-Effect Transistor** **Table 6** . . . where high density packaging is required.

The information in the tables is necessarily brief to simplify selection. Complete specifications for these devices are given in Volumes 1 and 2 of the Motorola Semiconductor Data Library.

For applications information,see "Selection and Use of FETs".

FIELD-EFFECT TRANSISTORS (continued)

INDEX TO MOTOROLA FIELD-EFFECT TRANSISTORS



The following table lists the Motorola field-effect transistors with reference to selection tables.

Device Type	Table	Device Type	Table	Device Type	Table	Device Type	Table
2N3330	3	2N4858	2	2N5638	2	MFE2011	2
2N3365	3	2N4858A	2	2N5639	2	MFE2012	2
2N3366	3	2N4859	2	2N5640	2	MFE2093	3,4
2N3367	3	2N4859A	2	2N5653	2	MFE2094	3,4
2N3796	3	2N4860	2	2N5654	2	MFE2095	3,4
2N3797	3	2N4860A	2	2N5668	1	MFE3001	3
2N3821	3	2N4861	2	2N5669	1	MFE3002	2
2N3822	3	2N4861A	2	2N5670	1	MFE3003	2
2N3823	1	2N5265	3	2N5716	3	MFE3004	1
2N3824	4	2N5266	3	2N5717	3	MFE3005	1
2N3909	3	2N5267	3	2N5718	3	MFE3006	1
2N3909A	3	2N5268	3	2N5797	3	MFE3007	1
2N3970	2	2N5269	3	2N5798	3	MFE3008	1
2N3971	2	2N5270	3	2N5799	3	MFE3020	2
2N3972	2	2N5358	3	2N5800	3	MFE3021	2
2N3993	3	2N5359	3	3N124	3,4	MFE4007	3
2N3994	3	2N5360	3	3N125	3,4	MFE4008	3
2N3994A	3	2N5361	3	3N126	3,4	MFE4009	3
2N4066	3	2N5362	3	3N128	3	MFE4010	3
2N4067	3	2N5363	3	3N140	1	MFE4011	3
2N4091	2	2N5364	3	3N155	2,4	MFE4012	3
2N4092	2	2N5457	3	3N155A	2,4	MFE5000	3
2N4093	2	2N5458	3	3N156	2,4	MMF1	5
2N4220	3,4	2N5459	3	3N156A	2,4	MMF2	5
2N4220A	3,4	2N5460	3	3N157	3	MMF3	5
2N4221	3,4	2N5461	3	3N157A	3	MMF4	5
2N4221A	3,4	2N5462	3	3N158	3	MMF5	5
2N4222	3,4	2N5463	3	3N158A	3	MMF6	5
2N4222A	3,4	2N5464	3	3N169	2,4	MMT3823	6
2N4223	1	2N5465	3	3N170	2,4	MPF102	1,3
2N4224	1	2N5471	3	3N171	2,4	MPF108	1
2N4342	3	2N5472	3	MFE130*	1	MPF109	3
2N4351	4	2N5473	3	MFE131	1	MPF111	3
2N4352	4	2N5474	3	MFE132	1	MPF112	3
2N4360	3	2N5475	3	MFE2000	1	MPF130*	1
2N4391	2	2N5476	3	MFE2001	1	MPF131	1
2N4392	2	2N5484	1,3	MFE2004	2	MPF132	1
2N4393	2	2N5485	1,3	MFE2005	2	MPF161	3
2N4416	1	2N5486	1,3	MFE2006	2	MPF256	3
2N4856	2	2N5555	2,4	MFE2007	2	MPF820	1
2N4856A	2	2N5556	3	MFE2008	2	MPF970	2
2N4857	2	2N5557	3	MFE2009	2	MPF971	2
2N4857A	2	2N5558	3	MFE2010	2	MPF4391	2
						MPF4392	2
						MPF4393	2

*The MPF/MFE130 through 132 series replaces the MPF/MFE120 through 122 series for all new designs.

FIELD EFFECT TRANSISTORS (continued)

TABLE 1 – RF AMPLIFIERS AND MIXERS

High performance single and dual gate devices specifically designed for RF applications. The transistors are listed first in order of decreasing specified test frequency; then in order of decreasing power gain (G_{ps}) and noise figure (NF).

Test Frequency MHz	G_{ps} dB Min	G_c dB Min	NF dB Max	C_{rss} pF Max	C_{oss} pF Max	Device Type	Case	Comments
N-CHANNEL J FETs Depletion								
400	10	–	4.0	0.8	2.0	2N4416	20	
400	10	–	4.0	1.0	2.0	2N5486	29	
400	10	–	4.0	1.0	2.0	2N5485	29	
400	10	–	4.0	1.0	2.0	MFE2000	20	
400	10	–	4.0	1.0	2.0	MFE2001	↓	
200	10	–	5.0	2.0	–	2N4223	↓	
200	–	–	–	2.0	–	2N4224	↓	
100	–	–	2.5	2.0	–	2N3823#	↓	
100	16	–	3.0	1.0	2.0	2N5484	29	
100	16	–	2.5	3.0	4.0	2N5668	↓	
100	16	–	2.5	3.0	4.0	2N5669	↓	
100	16	–	2.5	3.0	4.0	2N5670	↓	
100	–	–	–	3.0	–	MPF102	↓	
100	–	–	3.0	2.5	–	MPF108	↓	Box Sort, Color Coded 2:1 I_{DSS} Ratios
100	–	–	4.0	3.5†	3.5†	MPF820	↓	
N-CHANNEL MOS FETs Depletion/Enhancement								
400	10	–	4.5	0.2	–	MFE3005	20	
244	–	12	–	0.023†	4.0	MFE122	20	Dual Gate – Mixer
200	18	–	4.0	0.02†	3.5	MFE3007	20	Dual Gate
200	17	–	5.0	0.05	4.0	MPF131	262	Dual Gate
200	17	–	5.0	0.05	4.0	MFE131	20	Dual Gate
200	14‡	10	–	0.02†	4.0	MFE3008	↓	Dual Gate – Mixer
200	16	–	4.5	0.03	–	3N140	↓	Dual Gate
200	16	–	4.5	0.2	–	MFE3004	↓	
200	–	12	–	0.05	4.0	MPF132	262	Dual Gate – Mixer
200	–	12	–	0.05	4.0	MFE132	20	Dual Gate – Mixer
105	17	–	5.0	0.05	4.0	MPF130	262	Dual Gate
105	17	–	5.0	0.05	4.0	MFE130	20	Dual Gate
100	20	–	4.5	0.02†	4.0	MFE3006	↓	Dual Gate
100	14‡	14	–	0.02†	4.0	MFE3008	↓	Dual Gate – Mixer
60	20	–	5.0	0.023†	3.5	MFE121	↓	Dual Gate
60	20	–	5.0	0.05	4.0	MPF131	262	Dual Gate
60	20	–	5.0	0.05	4.0	MFE131	20	Dual Gate
60	–	15	–	0.05	4.0	MPF132	262	Dual Gate – Mixer
60	–	15	–	0.05	4.0	MFE132	20	Dual Gate – Mixer

† Typical
‡ Conversion Gain, Output frequency = 30 MHz
# 2N3823JAN Available

TABLE 2 – CHOPPERS

Because FETs have no offset voltage they are particularly well suited for chopper applications. Devices in this table are designed for low $r_{ds(on)}$, low C_{rss} and fast switching time. The FETs are listed first in order of decreasing $V_{(BR)GSS}$, increasing $r_{ds(on)}$, then in order of increasing C_{rss} and I_{DSS}.

$V_{(BR)GSS}$ Volts Min	$r_{ds(on)}$ Ohms Max	C_{rss} pF Max	I_{DSS} mA Min	$I_{D(off)}$ nA Max	Device Type	Case
N-CHANNEL J FETs DEPLETION						
−40	25	4.0	50	0.25	2N4856A	22
↓	25	8.0	50	0.25	2N4856	↓
↓	30	3.5	50	0.1	2N4391	↓
↓	30	5.0	30	0.2	2N4091	↓
↓	30	6.0	50	0.25	2N3970	↓

FIELD EFFECT TRANSISTORS (continued)

TABLE 2 (continued)

$V_{(BR)GSS}$ Volts Min	$r_{ds(on)}$ Ohms Max	C_{rss} pF Max	I_{DSS} mA Min	$I_{D(off)}$ nA Max	Device Type	Case
N-CHANNEL J FETs DEPLETION (continued)						
−40	40	3.5	20	0.25	2N4857A	22
	40	8.0	20	0.25	2N4857	
	50	5.0	15	0.2	2N4092	
	60	3.5	25	0.1	2N4392	
	60	3.5	8.0	0.25	2N4858A	
	60	6.0	25	0.25	2N3971	
	60	8.0	8.0	0.25	2N4858	
	80	5.0	8.0	0.2	2N4093	
	100	3.5	5.0	0.1	2N4393	
	100	6.0	5.0	0.25	2N3972	
−30	25	4.0	50	0.25	2N4859A	
	25	8.0	50	0.25	2N4859	
	30	3.5	60	1.0	MPF4391	29
	30	4.0	50	1000	2N5638	29
	30	5.0	30	0.2	MFE2006	22
	40	3.5	20	0.25	2N4860A	
	40	8.0	20	0.25	2N4860	
	50	3.5	40	1.0	2N5653	29
	50	5.0	15	0.2	MFE2005	22
	60	3.5	25	1.0	MPF4392	29
	60	3.5	8.0	0.25	2N4861A	22
	60	4.0	25	1000	2N5639	29
	60	8.0	8.0	0.25	2N4861	22
	80	5.0	8.0	0.2	MFE2004	22
	100	3.5	5.0	1.0	MPF4393	29
	100	3.5	15	1.0	2N5654	29
	100	4.0	5.0	1000	2N5640	29
−25	10	20	100	3.0	MFE2012	22
	15	20	40	3.0	MFE2011	
	20	15	50	2.0	MFE2009	
	25	20	15	3.0	MFE2010	
	30	15	20	2.0	MFE2008	
	40	15	8.0	3.0	MFE2007	
	150	1.2	15	10	2N5555§	29
P-CHANNEL J FETs DEPLETION						
30	100	5.0	15	10	MPF970	29-01
30	250	5.0	2.0	10	MPF971	29-01
N-CHANNEL MOS FETs ENHANCEMENT						
±30	100	1.0	10†	–	MFE3002	20
±25	200	1.3	10†	–	3N169#	
	200	1.3	10†	–	3N170#	
	200	1.3	10†	–	3N171#	
P-CHANNEL MOS FETs ENHANCEMENT						
±35	300	1.3	0.25†	–	3N155A*	20
	300	1.3	0.25†	–	3N156A*	
	600	1.3	1.0†	–	3N155*	
	600	1.3	1.0†	–	3N156*	
±30	200	1.0	10†	–	MFE3003	
−25	500	1.5	10†	–	MFE3020	642
−25	250	1.5	10†	–	MFE3021	642

*Designers Data Sheet

#Low $V_{GS(th)}$, High Speed

§High Speed, $t_{(on)}$ = 10 ns Max

†nA Max

TABLE 3 – GENERAL-PURPOSE AMPLIFIERS

This table includes a wide selection of N- and P-channel field-effect transistors designed for small-signal amplification at low and moderate frequencies (to 30 MHz). The transistors are listed in order of increasing Gate-Source Breakdown Voltage [$V_{(BR)GSS}$], then in order of decreasing Zero-Gate Voltage Drain Current (I_{DSS}) and Forward Transfer Admittance (y_{fs}).

$V_{(BR)GSS}$ Volts Min	I_{DSS} mA Min/Max	$\|y_{fs}\|$ µmhos mmhos* Min/Max	Device Type	Case	Comments
N-CHANNEL J FETs DEPLETION					
−20	0.5/20	500/–	MPF111	29	
−25	8.0/20	4000/8000	2N5486		Formerly MPF107
	4.0/16	2000/6000	2N5459		Formerly MFP105
	4.0/10	3500/7000	2N5485		Formerly MPF106
	2.0/9.0	1500/5500	2N5458		Formerly MPF104

FIELD EFFECT TRANSISTORS (continued)

TABLE 3 (continued)

$V_{(BR)GSS}$ Volts Min	I_{DSS} mA Min/Max	$\lvert y_{fs}\rvert$ μmhos mmhos* Min/Max	Device Type	Case	Comments
N-CHANNEL J FETs DEPLETION (continued)					
−25	2.0/20	2000/7500	MPF102	29	
	1.0/25	1000/7500	MPF112		
	1.0/5.0	1000/5000	2N5457		Formerly MPF103
	1.0/5.0	3000/6000	2N5484		2:1 I_{DSS} Ratio Box Sort, Color Coded
	0.5/24	800/6000	MPF109		
↓	6.0/13	6.0*/–	MPF256	↓	2:1 I_{DSS} Ratio, Box Sort, Color Coded
−30	5.0/15	2500/6000	2N4222	20	
	5.0/15	2500/6000	2N4222A		NF = 2.5 dB (Max) @ f = 100 Hz
	4.0/10	1500/6500	2N5558		e_N = 35 NV/$\sqrt{Hz}$ (Max) @ f = 10 Hz
	2.0/6.0	2000/5000	2N4221		
	2.0/6.0	2000/5000	2N4221A		NF = 2.5 dB (Max) @ f = 100 Hz
	2.0/5.0	1500/6500	2N5557		e_N = 35 NV/$\sqrt{Hz}$ (Max) @ f = 10 Hz
	0.5/3.0	1000/4000	2N4220		
	0.5/3.0	1000/4000	2N4220A		NF = 2.5 dB (Max) @ f = 100 Hz
↓	0.5/2.5	1500/6500	2N5556		e_N = 35 NV/$\sqrt{Hz}$ (Max) @ f = 10 Hz
−40	9.0/18	2700/6500	2N5364*		
	7.0/14	2500/6000	2N5363*		
	4.0/8.0	2000/5500	2N5362*		
	2.5/5.0	1500/4500	2N5361*		2:1 I_{DSS} Ratios
	1.5/3.0	1400/3200	2N5360*	↓	
	0.8/4.0	400/2000	2N3365	22	e_N = 75 NV/$\sqrt{Hz}$ @ f = 1 kHz
	0.8/1.6	1200/3600	2N5359*	20	
	0.8/4.0	500/2000	2N5718		
	0.5/1.0	1000/3000	2N5358*		
	0.2/1.0	250/1000	2N3366	22	e_N = 75 NV/$\sqrt{Hz}$ @ f = 1 kHz
	0.2/1.0	400/1600	2N5717	20	
	0.05/0.25	200/1000	2N5716	20	
↓	0.05/0.25	100/1000	2N3367	22	e_N = 75 NV/$\sqrt{Hz}$ @ f = 1 kHz
−50	3.0/9.0	1200/3600	3N126	20	Tetrode Connected
	2.0/10	3000/6500	2N3822#		
	1.5/4.5	800/2400	3N125		Tetrode Connected
	1.0/3.0	400/800	MFE2095		
	0.5/2.5	1500/4500	2N3821		
	0.4/1.4	350/700	MFE2094		
	0.2/2.0	500/2000	3N124		Tetrode Connected
↓	0.1/0.7	250/500	MFE2093	↓	
N-CHANNEL MOS FETs Depletion/Enhancement					
−50	5.0/25	5000/12000	3N128	20	I_{GSS} = 0.05 mAdc (Max)
±30	2.0/6.0	1500/3000	2N3797	22	I_{GSS} = 1.0 pAdc (Max)
±30	0.5/6.0	700/3500	MFE3001	20	
±30	0.5/3.0	900/1800	2N3796	22	I_{GSS} = 1.0 pAdc (Max)
P-CHANNEL J FETs DEPLETION					
+20	3.0/30	2000/8000	2N4360	29	
	1.0/15	2200/5000	2N3909A	20	
	0.3/15	1000/5000	2N3909		
↓	–	1500/3000	2N3330		
+25	10/–	6000/12000	2N3993	↓	
	4.0/12	2000/6000	2N4342	29	
	2.0/–	5000/10000	2N3994A	20	
↓	2.0/–	4000/10000	2N3994		
+40	7.0/14	2500/5000	MFE4012*	↓	2:1 I_{DSS} Ratio,
	4.0/16	2000/6000	2N5462	29	Formerly MPF153
	4.0/8.0	2200/4500	MFE4011*	20	2:1 I_{DSS} Ratio,
	1.0/5.0	1000/4000	2N5460	29	Formerly MPF151
	0.8/2.0	260/650	2N5476	20	
	0.8/1.6	1000/3000	MFE4008*	20	2:1 I_{DSS} Ratio,
	0.7/2.0	250/700	2N5800	29	NF = 1.8 dB (Typ) @ 1 kHz
	0.5/14	800/6000	MPF161	29	2:1 I_{DSS} Ratio,
	0.5/1.0	900/2700	MFE4007	20	2:1 I_{DSS} Ratio,
	0.4/1.0	200/500	2N5475		2.5:1 I_{DSS} Ratio
	0.25/1.0	160/500	2N5799	29	NF = 1.8 dB (Typ) @ 1 kHz
	0.2/0.5	160/400	2N5474	20	2.5:1 I_{DSS} Ratio
	0.1/0.25	120/300	2N5473	20	2.5:1 I_{DSS} Ratio
↓	0.08/0.4	100/400	2N5798	29	NF = 1.8 dB (Typ) @ 1 kHz

* Designers Data Sheet
# JAN and JANTX Available

FIELD EFFECT TRANSISTORS (continued)

TABLE 3 (continued)

$V_{(BR)GSS}$ Volts Min	I_{DSS} mA Min/Max	$\lvert Y_{fs} \rvert$ µmhos mmhos* Min/Max	Device Type	Case	Comments
P-CHANNEL J FETs DEPLETION (continued)					
+40	0.05/0.12	90/225	2N5472	20	2.5:1 I_{DSS} Ratio
↓	0.02/0.1	60/225	2N5797	29	NF = 1.8 dB (Typ) @ 1 kHz
↓	0.02/0.06	60/180	2N5471	20	2.5:1 I_{DSS} Ratio
+60	7.0/14	2500/5000	2N5270*	20	2:1 I_{DSS} Ratio,
↓	4.0/16	2000/6000	2N5465	29	Formerly MPF156
↓	4.0/8.0	2200/4500	2N5269*	20	2:1 I_{DSS} Ratio,
↓	2.5/5.0	2000/4000	2N5268*	20	2:1 I_{DSS} Ratio,
↓	2.0/9.0	1500/5000	2N5464	29	Formerly MPF155
↓	1.5/3.0	1500/3500	2N5267*	20	2:1 I_{DSS} Ratio,
↓	1.0/5.0	1000/4000	2N5463	29	Formerly MPF154
↓	0.8/1.6	1000/3000	2N5266*	↓	2:1 I_{DSS} Ratio,
↓	0.5/1.0	900/2700	2N5265*	↓	2:1 I_{DSS} Ratio,
P-CHANNEL MOS FETs ENHANCEMENT					
±30	–/1.0†	1500/–	2N4066	642	Dual
±30	–/1.0†	2500/–	2N4067	642	Dual
±35	–/1.0†	1000/4000	3N157*	20	
±35	–/1.0†	1000/4000	3N158*	20	
±40	–/10†	2000/8000	MFE5000	605B-02	Dual
±50	–/0.25†	1000/4000	3N157A*	20	
±50	–/0.25†	1000/4000	3N158A*	20	

† nAdc
* Designers Data Sheet

TABLE 4 — GENERAL-PURPOSE SWITCHES

The devices in this table have low feedback capacitances (C_{rss}) and relatively low drain-source resistance, [$r_{ds(on)}$], making them suitable for medium-speed switching applications. The transistors are listed first in order of decreasing Gate-Source Breakdown Voltage [$V_{(BR)GSS}$], then in order of increasing $r_{ds(on)}$, decreasing gate cutoff voltage [$V_{GS(off)}$ or $V_{GS(th)}$] and decreasing I_{DSS}.

$V_{(BR)GSS}$ Volts Min	$r_{ds(on)}$ Ohms Max	$V_{GS(off)}$ $V_{GS(th)}$* Volts Max	I_{DSS} $I_{D(on)}$* mA Min	Device Type	Case	Comments
N-CHANNEL J FETs DEPLETION						
–50	250	–	–	2N3824	20	
↓	500	6.5	3.0	3N126	↓	Tetrode Connected
↓	750	4.0	1.5	3N125	↓	Tetrode Connected
↓	1000	2.5	0.2	3N124	↓	Tetrode Connected
↓	1300	5.5	1.0	MFE2095	↓	
↓	1600	4.5	0.4	MFE2094	↓	
↓	2500	2.5	0.1	MFE2093	↓	
–30	300	8.0	5.0	2N4222	↓	
↓	300	8.0	5.0	2N4222A	↓	Low Noise
↓	400	6.0	2.0	2N4221	↓	
↓	400	6.0	2.0	2N4221A	↓	Low Noise
↓	500	4.0	0.5	2N4220	↓	
↓	500	4.0	0.5	2N4220A	↓	Low Noise
–25	150	–	15	2N5555	29	High Speed $t_{(on)}$ = 10 ns max
N-CHANNEL MOS FETs						
±30	300	5.0*	3.0*	2N4351	20	Complement to 2N4352
±25	200	1.5*	10*	3N169	↓	Low $V_{GS(th)}$, High Speed
↓	200	2.0*	10*	3N170	↓	Low $V_{GS(th)}$, High Speed
↓	200	3.0*	10*	3N171	↓	Low $V_{GS(th)}$, High Speed
P-CHANNEL MOS FETs						
±35	300	5.0*	5.0*	3N156A†	20	
↓	300	3.2*	5.0*	3N155A†	↓	
↓	600	5.0*	5.0*	3N156†	↓	
↓	600	3.2*	5.0*	3N155†	↓	
±30	600	5.0*	3.0*	2N4352	↓	Complement to 2N4351

† Designers Data Sheet

FIELD EFFECT TRANSISTORS (continued)

TABLE 5 – MATCHED PAIRS

Each type number in this table represents a pair of devices carefully matched for critical applications such as differential-amplifier service. Each pair is packaged in a metal clip to maintain pair identity.

I_{DSS} mA Min/Max	$\lvert y_{fs}\rvert$ μmhos Min	$\lvert y_{os}\rvert$ μmhos Max	C_{rss} pF Max	NF dB Max	$V_{(BR)GSS}$ Volts Min
4.0/2.0	3500	35	2.0	2.5	30

MATCHING CHARACTERISTICS

$\frac{\Delta\lvert V_{GS1}-V_{GS2}\rvert}{\Delta T}$ Max μV/°C	$\lvert V_{GS1}-V_{GS2}\rvert$ mV Max	$\lvert I_{G1}-I_{G2}\rvert$ nA Max	$\frac{\lvert y_{fs1}\rvert}{\lvert y_{fs2}\rvert}$ Min	Device Type	Case
10	5.0	10	0.98	MMF1	20
10	↓	↓	0.98	MMF2	↓
25			0.95	MMF3	
25			↓	MMF4	
50				MMF5	
50				MMF6	

TABLE 6 – MICRO-T FIELD-EFFECT TRANSISTOR N-CHANNEL

Field-Effect Transistor designed for RF Amplifier applications where high density packaging is required.

N-CHANNEL J FET DEPLETION

$V_{(BR)GSS}$ Volts Min	I_{DSS} mA Min/Max	C_{rss} pF Typ	$Re(y_{is})$ μmhos Typ	NF dB Typ	@ f MHz	Device Type	Case
–30	5.0/20	1.0	500	2.0	100	MMT3823	28

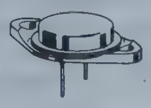
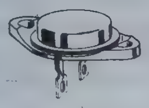
GERMANIUM POWER TRANSISTORS

This selector guide reflects the "preferred" Motorola germanium power transistors and can be used as a quick reference to find the best device for your applications.

ALLOY TRANSISTORS

Low-cost devices featuring high current gain and low saturation voltage.

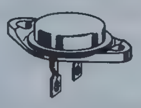
3-AMP

 TO-3 (Case 11)  TO-41(2) (Case 4-04)	**HIGH-FREQUENCY DRIVER** **LOW I_{CBO}** $P_D = 70$ W $f_T = 0.4$ MHz	h_{FE} $I_C = 0.5$ A, $V_{CE} = 2.0$ V	V_{CES}	30 V	45 V	60 V	75 V	90 V
			V_{CB}	30 V	45 V	60 V	75 V	90 V
		30-60		2N2137	2N2138	2N2139	2N2140	2N2141
		50-100		2N2142	2N2143	2N2144	2N2145	2N2146
 (Case 180) (Case 183) (Case 184)	**HIGH-FREQUENCY DRIVER** $P_D = 20$ W	h_{FE} $I_C = 1.0$ A, $V_{CE} = 0.5$ V	V_{CEO}	30 V	40 V	50 V	60 V	
			V_{CB}	40 V	60 V	80 V	100 V	
		20-60		2N1038	2N1039	2N1040	2N1041	
				2N2552	2N2553	2N2554	2N2555	
				2N2556	2N2557	2N2558	2N2559	

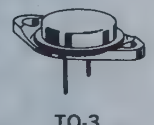
3.5-AMP

 (Case 180) (Case 183) (Case 184)	**HIGH-FREQUENCY DRIVER** $P_D = 20$ W	h_{FE} $I_C = 3.0$ A, $V_{CE} = 1.0$ V	V_{CEO}	30 V	40 V	50 V	60 V
			V_{CB}	40 V	60 V	80 V	100 V
		20-60		2N1042	2N1043	2N1044	2N1045
				2N2560	2N2561	2N2562	2N2563
				2N2564	2N2565	2N2566	2N2567

5-AMP

 TO-3 (Case 11)	**GENERAL-PURPOSE SWITCH AND AMPLIFIER** $P_D = 106$ W $f_T = 0.25$ MHz	h_{FE} $I_C = 3.0$ A, $V_{CE} = 2.0$ V	V_{CES}	30 V	45 V	60 V	75 V	90 V
			V_{CB}	40 V	60 V	80 V	100 V	120 V
		20-40		2N1529	2N1530	2N1531	2N1532	2N1533
		35-70		2N1534	2N1535	2N1536	2N1537	2N1538
 TO-41(2) (Case 4-04)	**HIGH-GAIN GENERAL-PURPOSE SWITCH AND AMPLIFIER** $P_D = 106$ W $f_T = 0.35$ MHz	h_{FE} $I_C = 3.0$ A, $V_{CE} = 2.0$ V	V_{CES}	30 V	45 V	60 V	75 V	90 V
			V_{CB}	40 V	60 V	80 V	100 V	120 V
		50-100		2N1539	2N1540	2N1541	2N1542	2N1543
		75-150		2N1544	2N1545	2N1546	2N1547	2N1548
 TO-66 (Case 80-02)	**ECONOMY LINE GENERAL-PURPOSE AMPLIFIER AND SWITCH** $P_D = 57$W $f_T = 350$ kHz	h_{FE} $I_C = 0.5$ A $V_{CE} = 2.0$ Vdc	V_{CES}	20V	30 V	45 V	60 V	75 V
		• 15-350		2N5887	2N5888			
		• 30-70			2N5889	2N5890	2N5891	2N5892
		• 60-120			2N5893	2N5894	2N5895	2N5896
		• 100-200			2N5897	2N5898	2N5899	2N5900
		175-350			2N5901			

7-AMP

 TO-3 (Case 11) TO-41(2) (Case 4-04)	**ECONOMY LINE GENERAL-PURPOSE AMPLIFIER AND SWITCH** $P_D = 85$W $f_T = 0.3$ MHz	h_{FE} $I_C = 3.0$ A, $V_{CE} = 2.0$ V	V_{CES}	30 V	45 V	60 V	60 V	75 V	75 V
			V_{CB}	40 V	60 V	75 V	80 V	90 V	100 V
		30-60					2N3615		2N3616
		35-70		2N3611	2N3612				
		45-90					2N3617		2N3618
		60-120		2N3613	2N3614				
		30-200		MP2060(4)	MP2061(4)	MP2062(4)		MP2063(4)	

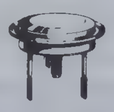
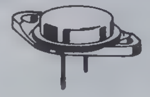
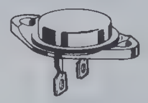
See notes on page 5-42

GERMANIUM POWER TRANSISTORS (continued)

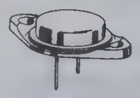
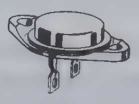
10-AMP

CASE 8	HIGH-VOLTAGE SWITCH $P_D = 56$ W $f_T = 300$ MHz	h_{FE} $I_C = 3.0$ A, $V_{CE} = 2.0$ V	V_{CEO}	80	120	160
			V_{CB}	80	120	160
		20-50		2N6064	2N6065	2N6066

15-AMP

 TO-36 (Case 5)	GENERAL-PURPOSE SWITCH AND AMPLIFIER $P_D = 170$ W $f_T = 0.25$ MHz	h_{FE} $I_C = 5.0$ A, $V_{CE} = 2.0$ V	V_{CES}	40 V	50 V	70 V	80 V
			V_{CB}	40 V	50 V	70 V	80 V
		20-40		2N2078	2N2077	2N2076	2N2075
		35-70		2N2082	2N2081	2N2080	2N2079
 TO-3 (Case 11A)	HIGH-SPEED SWITCH AND AMPLIFIER $P_D = 106$ W $f_T = 0.40$ MHz	h_{FE} $I_C = 10$ A, $V_{CE} = 2.0$ V	V_{CES}	30 V	45 V	60 V	75 V
			V_{CB}	40 V	60 V	80 V	100 V
		10-30		2N1549	2N1550	2N1551	2N1552
 TO-41(2) (Case 4-04)	HIGH-GAIN SWITCH AND AMPLIFIER $P_D = 106$ W $f_T = 0.35$ MHz	h_{FE} $I_C = 10$ A, $V_{CE} = 2.0$ V	V_{CES}	30 V	45 V	60 V	75 V
			V_{CB}	40 V	60 V	80 V	100 V
		30-60		2N1553	2N1554	2N1555	2N1556
		50-100		2N1557	2N1558	2N1559	2N1560

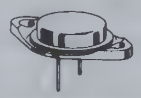
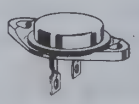
25-AMP

 TO-3 (Case 11A)  TO-41(3) (Case 4-04)	HIGH-GAIN SWITCH AND AMPLIFIER $P_D = 106$ W $f_T = 0.35$ MHz	h_{FE} $I_C = 25$ A, $V_{CE} = 1.0$ V	V_{CES}	35 V	60 V	75 V
			V_{CB}	50 V	80 V	100 V
		15-65		2N1162	2N1164	2N1166
				2N1163	2N1165	2N1167

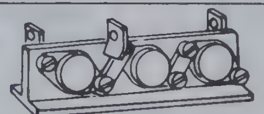
30-AMP

TO-36 (Case 5)	MEDIUM-CURRENT SWITCH $P_D = 170$ W $f_T = 0.25$ MHz	h_{FE} $I_C = 5.0$ A, $V_{CE} = 2.0$ V ($h_{FE} = 15$ min @ $I_C = 25$ A)	V_{CES}	45 V	60 V	75 V	90 V
			V_{CB}	45 V	60 V	75 V	90 V
		50-100		2N2152	2N2153	2N2154	2N2155
		80-160		2N2156	2N2157	2N2158	2N2159

60-AMP

CASE 7	HIGH-CURRENT — HIGH-GAIN SWITCH $P_D = 170$ W $f_T = 0.25$ MHz	h_{FE} $I_C = 15$ A, $V_{CE} = 2.0$ V ($h_{FE} = 12$ min @ $I_C = 50$ A)	V_{CES}	45 V	60 V	75 V	90 V
			V_{CB}	45 V	60 V	75 V	90 V
		30-60		MP500	MP501	MP502	MP503
		50-100		MP504	MP505	MP506	MP507
	HIGH-CURRENT — HIGH-GAIN SWITCH $P_D = 170$ W $f_T = 0.45$ MHz	h_{FE} $I_C = 15$ A, $V_{CE} = 2.0$ V ($h_{FE} = 15$ min @ $I_C = 60$ A)	V_{CES}	45 V	60 V	75 V	
			V_{CB}	45 V	60 V	75 V	
		60-120		2N4048	2N4049	2N4050	
		80-180		2N4051	2N4052	2N4053	
 TO-3 (Case 3A)  TO-41(2) (Case 161)	ECONOMY LINE HIGH-CURRENT — HIGH-GAIN SWITCH $P_D = 170$ W $f_T = 0.4$ MHz	h_{FE} $I_C = 15$ A, $V_{CE} = 2.0$ V ($h_{FE} = 15$ min @ $I_C = 60$ A)	V_{CES}	30 V	45 V	60 V	75 V
			V_{CB}	30 V	45 V	60 V	75 V
		60-120		2N4276	2N4278	2N4280	2N4282
		80-180		2N4277	2N4279	2N4281	2N4283

150-AMP

 CASE 118	"POWER-PAC" ASSEMBLY MEDIUM VOLTAGE SWITCH $P_D = 250$ W $\theta_{JC} = 0.33$°C/W	h_{FE} $I_C = 150$ A, $V_{CE} = 2.0$ V	V_{CES}	60 V	75 V
			V_{CEO}	45 V	60 V
		15 Min		MP801(1)	MP800(1)

See notes on page 5-42

GERMANIUM POWER TRANSISTORS (continued)

DIFFUSED BASE TRANSISTORS

Features graded-base profile for:

- Low emitter-base resistance and high-temperature stability
- High breakdown voltage capability
- Higher frequency response, faster switching speeds

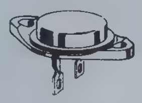
10-AMP

TO-3 (Case 11A)	HIGH-SPEED SWITCH $P_D = 70$ W	h_{FE} $I_C = 5.0$ A, $V_{CE} = 2.0$ V	V_{CEO}	30 V	50 V	70 V
			V_{CB}	40 V	80 V	120 V
		50-120		2N2291	2N2292	2N2293
		20-60	V_{CER}	40 V	80 V	120 V
			V_{CB}	40 V	80 V	120 V
				2N2288	2N2289	2N2290

10-AMP

TO-3 (Case 11A) TO-41(2) (Case 4-04)	HIGH-VOLTAGE SWITCH $P_D = 85$ W $f_T = 0.7$ MHz	h_{FE} $I_C = 3.0$ A, $V_{CE} = 2.0$ V	V_{CEO}	80 V	120 V		160 V
			V_{CB}	80 V	120 V		160 V
		20-50		2N2526	2N2527		2N2528
TO-3 (Case 11) TO-41(2) (Case 4-04)	HIGH-VOLTAGE MEDIUM-SPEED SWITCH $P_D = 56$ W $f_T = 5.5$ MHz $f_T = 1.0$ MHz (MP3730, MP3731)	h_{FE}	†V_{CES} V_{CEO}	200 V†	150 V	320 V†	200 V
			V_{CB}		250 V		325 V
		20-60 $I_C = 5.0$ A, $V_{CE} = 2.0$ V			2N5324		2N5325
		15 Min $I_C = 2.25$ A, $V_{CE} = 4.0$ V		(4) MP3730			
		15 Min $I_C = 6.0$ A, $V_{CE} = 3.0$ V				MP3731	

20-AMP

TO-3 (Case 11A)  TO-41 (Case 4-04)	HIGH-SPEED HIGH-VOLTAGE SWITCH $P_D = 85$ W $f_T = 20$ MHz	h_{FE} $I_C = 10$ A, $V_{CE} = 2.0$ V	V_{CEO}	50 V	50 V	75 V	75 V	100 V	100 V
			V_{CB}	80 V	100 V	120 V	140 V	140 V	160 V
		25-100		(2) 2N2832	(4) MP1612	(2) 2N2833	(4) MP1612A	(2) 2N2834	(4) MP1612B

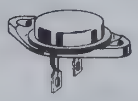
FOR MILITARY APPLICATIONS

JAN 2N174A	MIL-S-19500/13	JAN 2N1412	MIL S 19500/76	JAN 2N1554A	MIL-S-19500/331
JAN 2N297A	MIL-S-19500/36	JAN 2N1412A	MIL-S-19500/76	JAN 2N1555A	MIL S 19500/331
JAN 2N665	MIL-S-19500/58	JAN 2N1549A	MIL S-19500/332	JAN 2N1556A	MIL-S-19500/331
JAN 2N1011	MIL-S-19500/67	JAN 2N1550A	MIL S-19500/332	JAN 2N2079A	MIL S 19500/340
JAN 2N1120	MIL-S-19500/68	JAN 2N1551A	MIL-S-19500/332	JAN 2N2528	MIL-S-19500/309
JAN 2N1165	MIL-S-19500/178	JAN 2N1552A	MIL-S-19500/332		
JAN 2N1358	MIL-S-19500/122	JAN 2N1553A	MIL-S-19500/331		

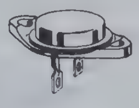
Also available as standard devices.

See notes page 5-42

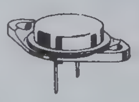
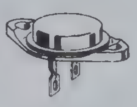
25-AMP

TO-3 (Case 11A)	MEDIUM-CURRENT "ADE"[5] SWITCH HIGH-GAIN $P_D = 85$ W	h_{FE}	V_{CEO}	50 V	60 V	70 V	80 V	
		$I_C = 5.0$ A, $V_{CE} = 2.0$ V	V_{CB}	75 V	75 V	90 V	90 V	
		50 Min		MP600[4]	MP601[4]	MP602[4]	MP603[4]	
 TO-41[2] (Case 4-04)	MEDIUM-CURRENT "ADE"[5] SWITCH HIGH-VOLTAGE $P_D = 106$ W $f_T = 0.4$ MHz	h_{FE} $I_C = 8.0$ A, $V_{CE} = 2.0$ V	V_{CEO}	30 V	60 V	80 V	100 V	120 V
			V_{CEX}	60 V	80 V	100 V	120 V	140 V
		25-100						2N5155
		25 Min		MP2000A[4]	MP2100A[4]	MP2200A	MP2300A[4]	MP2400A[4]

40-AMP

CASE 3A (TO-3) 2N5692 Series	 CASE 161 (TO-41) MP5692 Series	HIGH-CURRENT FAST SWITCHING "ADE" SWITCH $P_D = 120$ W $f_T = 0.2$ MHz	h_{FE} $I_C = 25$ A, $V_{CE} = 2.0$ V	V_{CEO}	30 V	60 V	80 V	100 V	120 V
				V_{CB}	50 V	80 V	100 V	120 V	140 V
			10 Min $I_C = 40$ A, $V_{CE} = 2.0$ V		2N5692	2N5693	2N5694	2N5695	2N5696

60-AMP

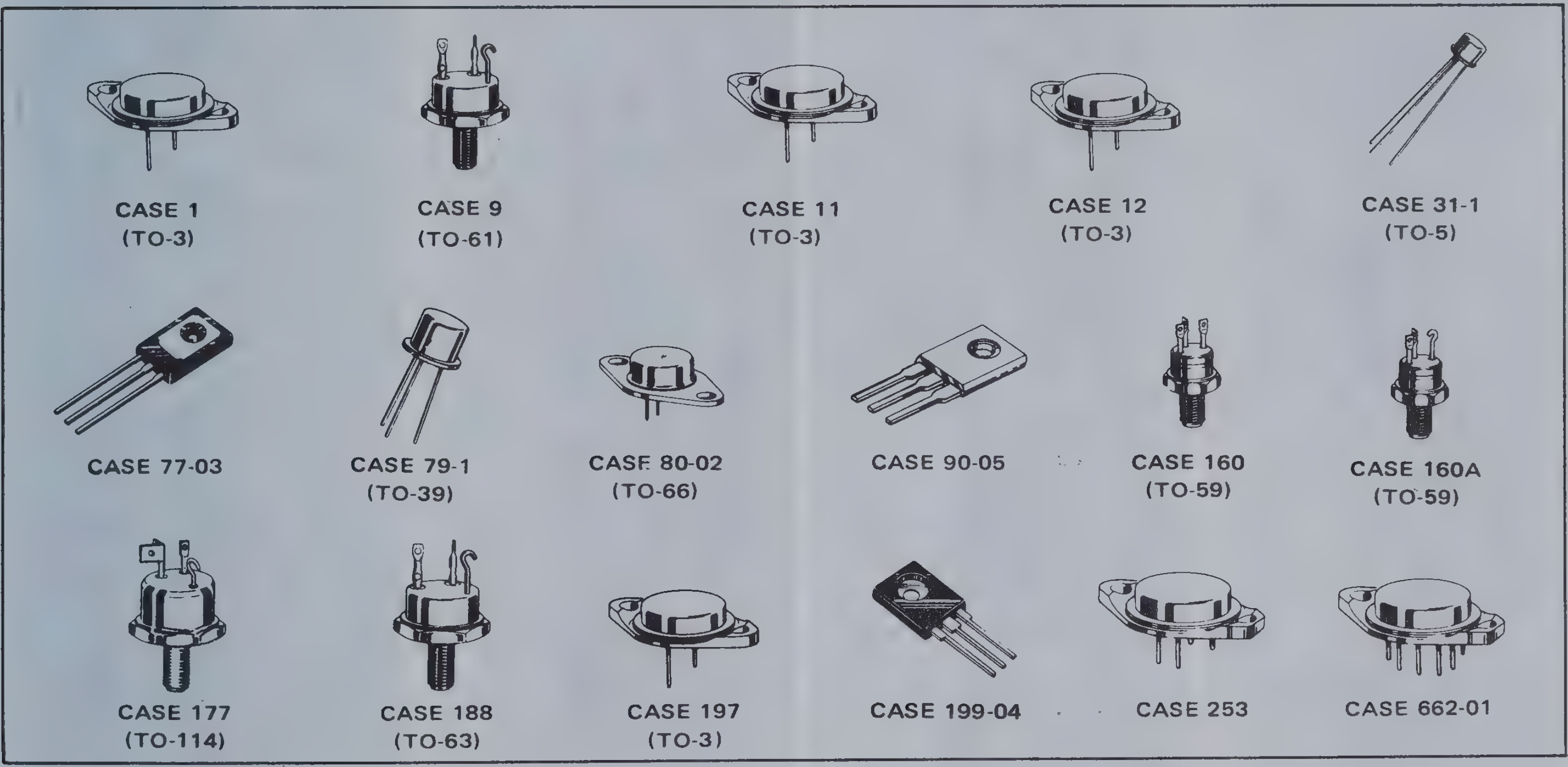
 TO-3 (Case 3A)	 TO-41(2) (Case 161)	HIGH-CURRENT — HIGH-VOLTAGE "ADE"⑤ SWITCH $P_D = 120$ W $f_T = 1.0$ MHz	h_{FE} $I_C = 25$ A, $V_{CE} = 2.0$ V	V_{CEO}	60 V	90 V	120 V
				V_{CB}	80 V	110 V	140 V
			20-60 ($h_{FE} = 10$ min @ $I_C = 60$ A)		2N5435	2N5436	2N5437
			40-120 ($h_{FE} = 15$ min @ $I_C = 60$ A)		2N5438	2N5439	2N5440

Notes:

(1) For epoxy encapsulated "PAC" add "A" to device type (i.e. MP801A)
(2) TO-41, add the prefix "MP" in place of "2N" (i.e. MP2137)
(3) TO-41, order odd numbered devices (i.e. 2N1163)
(4) Special order for TO-41; contact your local Motorola Sales office
(5) Alloy Diffused Epitaxial Process

SILICON POWER TRANSISTORS

This Selector Guide is published by Motorola to help the designer choose the best silicon power transistors for his new equipment and find suitable replacements for devices used in older designs. It is a comprehensive listing of the industry's most complete line of PNP and NPN silicon power transistors, and contains over 200 devices rated at currents between 100 mA and 60 amperes, and at voltages up to 600 volts. The transistors are in fifteen popular cases, including three low-cost plastic packages and hermetically sealed cases capable of dissipating up to 300 watts.



CASE 1 (TO-3)
CASE 9 (TO-61)
CASE 11 (TO-3)
CASE 12 (TO-3)
CASE 31-1 (TO-5)
CASE 77-03
CASE 79-1 (TO-39)
CASE 80-02 (TO-66)
CASE 90-05
CASE 160 (TO-59)
CASE 160A (TO-59)
CASE 177 (TO-114)
CASE 188 (TO-63)
CASE 197 (TO-3)
CASE 199-04
CASE 253
CASE 662-01

TABLE OF CONTENTS

The first table of the guide is a numerical-alphabetical index to all silicon power transistors manufactured by Motorola. The number of the selection table in which each device is further characterized is also listed.

COMPLEMENTARY TRANSISTORS

One reason for the wide use of Motorola power transistors is the design flexibility that results from the large number of "off the shelf" complementary transistors in the line. For convenience in choosing complements, a table of complementary power transistors is given following the index. A selection can be made from the complements on the basis of maximum collector current, case, and voltage.

SELECTION TABLES

The major part of this guide is composed of selection tables. These tables list all Motorola silicon power transistors in an order that makes it easy for the user to find a device that satisfies his requirements. Each table contains devices in the same package, and the table is separated first into NPN and PNP devices.

Within each table, the transistors are listed first in order of increasing breakdown voltage, then in increasing order of current and h_{FE}.

The tables list only the most basic characteristics of each device. For complete information on any Motorola power transistor refer to the individual data sheet or the appropriate pages in the Semiconductor Data Library.

If a standard part listed in this selector guide does not fulfill all requirements, a special part might be desirable. Motorola has the production capability and flexibility to supply devices especially tailored to specific OEM application needs. Where suitable power transistors cannot be selected from this guide, inquiries should be made at the nearest Motorola sales office.

INDEX

Device Type	Table #	Device Type	Table #	Device Type	Table #	Device Type	Table #
2N1724	9	2N4900	4	2N5683	1	2N6058	12
2N1725	9	2N4901	1	2N5684	1	2N6059	12
2N3021	1	2N4902	1	2N5685	1	2N6182	8
2N3022	1	2N4903	1	2N5686	1	2N6183	8
2N3023	1	2N4904	1	2N5745	1	2N6184	8
2N3024	1	2N4905	1	2N5758	1	2N6185	8
2N3025	1	2N4906	1	2N5759	1	2N6186	8
2N3026	1	2N4910	4	2N5760	1	2N6187	8
2N3054	4	2N4911	4	2N5867	1	2N6188	8
2N3054A	4	2N4912	4	2N5868	1	2N6189	8
2N3055	1	2N4913	1	2N5869	1	2N6190	3
2N3232	1	2N4914	1	2N5870	1	2N6191	3
2N3235	1	2N4915	1	2N5871	1	2N6192	3
2N3439	2	2N4918	5	2N5872	1	2N6193	3
2N3440	2	2N4919	5	2N5873	1	2N6226	1
2N3441	4	2N4920	5	2N5874	1	2N6227	1
2N3442	1	2N4921	5	2N5875	1	2N6228	1
2N3445	1	2N4922	5	2N5876	1	2N6229	1
2N3446	1	2N4923	5	2N5877	1	2N6230	1
2N3447	1	2N5050	4	2N5878	1	2N6231	1
2N3448	1	2N5051	4	2N5879	1	2N6233	4
2N3487	9	2N5052	4	2N5880	1	2N6234	4
2N3488	9	2N5067	1	2N5881	1	2N6235	4
2N3489	9	2N5068	1	2N5882	1	2N6253	1
2N3490	9	2N5069	1	2N5883	1	2N6254	1
2N3491	9	2N5157	1	2N5884	1	2N6257	1
2N3583	4	2N5190	5	2N5885	1	2N6262	1
2N3584	4	2N5191	5	2N5886	1	2N6274	1
2N3585	4	2N5192	5	2N5974	6	2N6275	1
2N3492	9	2N5193	5	2N5975	6	2N6276	1
2N3713	1	2N5194	5	2N5976	6	2N6277	1
2N3714	1	2N5195	5	2N5977	6	2N6278	10
2N3715	1	2N5241	1	2N5978	6	2N6279	10
2N3716	1	2N5301	1	2N5979	6	2N6280	10
2N3719	2	2N5302	1	2N5980	6	2N6281	10
2N3720	2	2N5303	1	2N5981	6	2N6282	12
2N3738	4	2N5304	9	2N5982	6	2N6283	12
2N3739	4	2N5334	3	2N5983	6	2N6284	12
2N3740	4	2N5335	3	2N5984	6	2N6285	12
2N3741	4	2N5336	3	2N5985	6	2N6286	12
2N3766	4	2N5337	3	2N5986	6	2N6287	12
2N3767	4	2N5338	3	2N5987	6	2N6294	12
2N3771	1	2N5339	3	2N5988	6	2N6295	12
2N3772	1	2N5344	4	2N5989	6	2N6296	12
2N3773	1	2N5345	4	2N5990	6	2N6297	12
2N3788	1	2N5346	8	2N5991	6	2N6298	12
2N3789	1	2N5347	8	2N6029	1	2N6299	12
2N3790	1	2N5348	8	2N6030	1	2N6300	12
2N3791	1	2N5349	8	2N6031	1	2N6301	12
2N3792	1	2N5427	4	2N6034	13	2N6302	1
2N3867	2	2N5428	4	2N6035	13	2N6303	2
2N3868	2	2N5429	4	2N6036	13	2N6306	1
2N3902	1	2N5430	4	2N6037	13	2N6307	1
2N4231	4	2N5477	8	2N6038	13	2N6308	1
2N4232	4	2N5478	8	2N6039	13	2N6315	4
2N4233	4	2N5479	8	2N6040	13	2N6316	4
2N4234	2	2N5480	8	2N6041	13	2N6317	4
2N4235	2	2N5629	1	2N6042	13	2N6318	4
2N4236	2	2N5630	1	2N6043	13	2N6338	1
2N4237	2	2N5631	1	2N6044	13	2N6339	1
2N4238	2	2N5632	1	2N6045	13	2N6340	1
2N4239	2	2N5633	1	2N6049	4	2N6341	1
2N4240	4	2N5634	1	2N6050	12	2N6355	12
2N4347	1	2N5655	5	2N6051	12	2N6356	12
2N4348	1	2N5656	5	2N6052	12	2N6357	12
2N4398	1	2N5657	5	2N6053	12	2N6358	12
2N4399	1	2N5679	2	2N6054	12	2N6359	1
2N4877	3	2N5680	2	2N6055	12	2N6360	1
2n4898	4	2N5681	2	2N6056	12	2N6360	1
2N4899	4	2N5682	2	2N6057	12	2N6377	1

INDEX (continued)

Device Type	Table #	Device Type	Table #	Device Type	Table #	Device Type	Table #
2N6378	1	MJ3701	4	MJE340K	7	MJE2901K	7
2N6379	1	MJ3771	1	MJE341	5	MJE2955	6
2N6380	10	MJ3772	1	MJE341K	7	MJE2955K	7
2N6381	10	MJ4000	12	MJE344	5	MJE3054	7
2N6382	10	MJ4001	12	MJE344K	7	MJE3055	6
BU105	1	MJ4010	12	MJE345	5	MJE3055K	7
BU108	1	MJ4011	12	MJE370	5	MJE3370	5
MJ105	1	MJ4030	12	MJE370K	7	MJE3371	5
MJ400	4	MJ4031	12	MJE371	5	MJE3439	5
MJ410	1	MJ4032	12	MJE371K	7	MJE3440	5
MJ411	1	MJ4033	12	MJE520	5	MJE3520	5
MJ413	1	MJ4034	12	MJE520K	7	MJE3521	5
MJ420	2	MJ4035	12	MJE521	5	MJE3738	7
MJ421	2	MJ4200	12	MJE521K	7	MJE3739	7
MJ423	1	MJ4201	12	MJE700	13	MJE3740	7
MJ424	1	MJ4210	12	MJE701	13	MJE3741	7
MJ425	1	MJ4211	12	MJE702	13	MJE4918	7
MJ431	1	MJ4240	4	MJE703	13	MJE4919	7
MJ450	1	MJ4502	1	MJE710	5	MJE4920	7
MJ480	1	MJ4645	3	MJE711	5	MJE4921	7
MJ481	1	MJ4646	3	MJE712	5	MJE4922	7
MJ490	1	MJ4647	3	MJE720	5	MJE4923	7
MJ491	1	MJ4648	3	MJE721	5	MJE5190	7
MJ500	8	MJ5415	3	MJE722	5	MJE5192	7
MJ501	8	MJ5416	3	MJE800	13	MJE5193	7
MJ802	1	MJ6257	1	MJE801	13	MJE5194	7
MJ900	12	MJ6700	8	MJE802	13	MJE5195	7
MJ901	12	MJ6701	8	MJE803	13	MJE5655	7
MJ920	12	MJ7000	10	MJE1090	13	MJE5656	7
MJ921	12	MJ7200	11	MJE1091	13	MJE5657	7
MJ1000	12	MJ7201	11	MJE1092	13	MJE5974	7
MJ1001	12	MJ8100	3	MJE1093	13	MJE5975	7
MJ1200	12	MJ8101	3	MJE1100	13	MJE5976	7
MJ1201	12	MJ8400	1	MJE1101	13	MJE5977	7
MJ1800	1	MJ9000	1	MJE1102	13	MJE5978	7
MJ2249	4	MJE105	6	MJE1103	13	MJE5979	7
MJ2250	4	MJE105K	7	MJE1290	6	MJE5980	7
MJ2251	4	MJE170	5	MJE1291	6	MJE5981	7
MJ2252	4	MJE171	5	MJE1660	6	MJE5982	7
MJ2253	4	MJE172	5	MJE1661	6	MJE5983	7
MJ2254	4	MJE180	5	MJE2010	7	MJE5984	7
MJ2267	1	MJE181	5	MJE2011	7	MJE5985	7
MJ2268	1	MJE182	5	MJE2020	7	MJE6040	13
MJ2500	12	MJE200	5	MJE2021	7	MJE6041	13
MJ2501	12	MJE205	6	MJE2090	13	MJE6042	13
MJ2801	1	MJE205K	7	MJE2091	13	MJE6043	13
MJ2840	1	MJE210	5	MJE2092	13	MJE6044	13
MJ2841	1	MJE220	5	MJE2093	13	MJE6045	13
MJ2901	1	MJE221	5	MJE2100	13	MPC1000	14
MJ2940	1	MJE222	5	MJE2101	13		
MJ2941	1	MJE223	5	MJE2102	13		
MJ2955	1	MJE224	5	MJE2103	13		
MJ3000	12	MJE225	5	MJE2160	7		
MJ3001	12	MJE230	5	MJE2360	7		
MJ3026	1	MJE231	5	MJE2361	7		
MJ3027	1	MJE232	5	MJE2370	7		
MJ3028	1	MJE233	5	MJE2371	7		
MJ3029	1	MJE234	5	MJE2480	7		
MJ3030	1	MJE235	5	MJE2481	7		
MJ3101	4	MJE240	5	MJE2482	7		
MJ3201	4	MJE241	5	MJE2483	7		
MJ3202	4	MJE242	5	MJE2490	7		
MJ3260	1	MJE243	5	MJE2491	7		
MJ3430	1	MJE244	5	MJE2520	7		
MJ3480	1	MJE250	5	MJE2521	7		
MJ3520	12	MJE251	5	MJE2522	7		
MJ3521	12	MJE252	5	MJE2523	7		
MJ3583	4	MJE253	5	MJE2801	6		
MJ3584	4	MJE254	5	MJE2801K	7		
MJ3585	4	MJE340	5	MJE2901	6		

SILICON POWER TRANSISTORS (continued)

COMPLEMENTARY POWER TRANSISTORS

I_C Max	Package	BV_{CEO}	NPN	PNP	Table
0.25A	TO-66	225	2N3738	MJ3738	4
		300	2N3739	MJ3739	4
1.0 A	TO-5	100	2N5681	2N5679	2
		120	2N5682	2N5680	2
	TO-66	175	2N3583	MJ3583	4
1.5 A	Case 77-03	40	MJE720	MJE710	5
		60	MJE721	MJE711	5
		80	MJE722	MJE712	5
2.0A	TO-66	250	2N3584	MJ3584	4
		300	2N3585	MJ3585	4
		300	2N4240	MJ4240	4
3.0 A	TO-5	40	2N4237	2N4234	2
		60	2N4238	2N4235	2
		80	2N4239	2N4236	2
	Case 77-03	40	2N4921	2N4918	5
		60	2N4922	2N4919	5
		80	2N4923	2N4920	5
		40	MJE180	MJE170	5
		60	MJE181	MJE171	5
		80	MJE182	MJE172	5
		30	MJE520	MJE370	5
	Case 199-04	30	MJE520K	MJE370K	7
	Case 77-03	30	MJE3520	MJE3370	5
	Case 199-04	40	MJE2520	MJE2370	7
		60	MJE2521	MJE2371	7
		40	MJE2522	MJE2490	7
		60	MJE2523	MJE2491	7
		40	MJE4921	MJE4918	7
		60	MJE4922	MJE4919	7
		80	MJE4923	MJE4920	7
4.0 A	TO-66	55	2N3054A	2N6049	4
		60	2N3766	2N3740	4
		80	2N3767	2N3741	4
		40	2N4910	2N4898	4
		60	2N4911	2N4899	4
		80	2N4912	2N4900	4
	Case 77-03	40	2N5190	2N5193	5
		60	2N5191	2N5194	5
		80	2N5192	2N5195	5
	Case 77-03	40	2N6037	2N6034	13
		60	2N6038	2N6035	13
		80	2N6039	2N6036	13
	Case 77-03	40	MJE521	MJE371	5
		40	MJE3521	MJE3371	5
	Case 199-04	40	MJE521K	MJE371K	7
	Case 77-03	60	MJE800	MJE700	13
		60	MJE801	MJE701	13
		80	MJE802	MJE702	13
		80	MJE803	MJE703	13
	TO-3	40	MJ480	MJ490	1
		60	MJ481	MJ491	1
		60	MJ4000	MJ4010	12
		80	MJ4001	MJ4011	12
	Case 253	60	MJ4200	MJ4210	12
		80	MJ4201	MJ4211	12
	Case 77-03	40	MJE220	MJE230	5
		40	MJE221	MJE231	5
		40	MJE222	MJE232	5
		60	MJE223	MJE233	5
		60	MJE224	MJE234	5
		60	MJE225	MJE235	5

SILICON POWER TRANSISTORS (continued)
COMPLEMENTARY POWER TRANSISTORS (continued)

I_C Max	Package	BV_{CEO}	NPN	PNP	Table
4.0 A Contd.	Case 77-03 Contd.	80	MJE240	MJE250	5
		80	MJE241	MJE251	5
		80	MJE242	MJE252	5
		100	MJE243	MJE253	5
		100	MJE244	MJE254	5
	Case 199-04	40	MJE5190	MJE5193	7
		60	MJE5191	MJE5194	7
		80	MJE5192	MJE5195	7
5.0 A	Case 90-05	50	MJE205	MJE105	6
	Case 199-04	50	MJE205K	MJE105K	7
	Case 90-05	60	MJE1100	MJE1090	13
		60	MJE1101	MJE1091	13
		80	MJE1102	MJE1092	13
		80	MJE1103	MJE1093	13
	TO-3	40	2N5067	2N4901	1
		60	2N5068	2N4902	1
		80	2N5069	2N4903	1
		40	2N4913	2N4904	1
		60	2N4914	2N4905	1
		80	2N4915	2N4906	1
		60	2N5869	2N5867	1
		80	2N5870	2N5868	1
	Case 90-05	40	2N5977	2N5974	6
		60	2N5978	2N5975	6
		80	2N5979	2N5976	6
	TO-39	80	2N5336	2N6190	3
		80	2N5337	2N6191	3
		100	2N5338	2N6192	3
		100	2N5339	2N6193	3
	Case 77-03	25	MJE200	MJE210	5
	Case 199-04	40	MJE5977	MJE5974	7
		60	MJE5978	MJE5975	7
		80	MJE5979	MJE5976	7
		40	MJE2020	MJE2010	7
		60	MJE2021	MJE2011	7
6.0 A	TO-3	100	2N5758	2N6226	1
		120	2N5759	2N6227	1
		140	2N5760	2N6228	1
7.0 A	TO-3	60	2N5873	2N5871	4
		80	2N5874	2N5872	4
	TO-66	60	2N6315	2N6317	4
		80	2N6316	2N6318	4
8.0 A	199-04	60	2N6043	2N6040	13
		80	2N6044	2N6041	13
		100	2N6045	2N6042	13
	TO-3	60	2N6055	2N6053	12
		80	2N6056	2N6054	12
	Case 80-02	60	2N6300	2N6298	12
		80	2N6301	2N6299	12
	TO-3	60	MJ1000	MJ900	12
		80	MJ1001	MJ901	12
	90-05	60	MJE6043	MJE6040	13
		80	MJE6044	MJE6041	13
		100	MJE6045	MJE6042	13
10 A	Case 90-05	60	MJE2801	MJE2901	6
		60	MJE3055	MJE2955	6

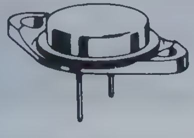
SILICON POWER TRANSISTORS (continued)

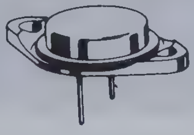
COMPLEMENTARY POWER TRANSISTORS (continued)

I_C Max	Package	BV_{CEO}	NPN	PNP	Table
10 A Contd.	Case 199-04	60	MJE2801K	MJE2901K	7
		60	MJE3055K	MJE2955K	7
	TO-3	60	2N3713	2N3789	1
		80	2N3714	2N3790	1
		60	2N3715	2N3791	1
		80	2N3716	2N3792	1
	TO-3	60	2N3055	2N4908	1
		60	MJ2840	MJ2940	1
		80	MJ2841	MJ2941	1
		60	2N5877	2N5875	1
		80	2N5878	2N5876	1
		100	2N5632	2N6229	1
		120	2N5633	2N6230	1
		140	2N5634	2N6231	1
	TO-59	80	2N5477	2N6182	8
		80	2N5478	2N6183	8
		100	2N5479	2N6184	8
		100	2N5480	2N6185	8
		80	2N5346	2N6186	8
		80	2N5347	2N6187	8
		100	2N5348	2N6188	8
		100	2N5349	2N6189	8
	TO-3	60	MJ3000	MJ2500	12
		80	MJ3001	MJ2501	12
12 A	Case 90-05	40	2N5989	2N5986	6
		60	2N5990	2N5987	6
		80	2N5991	2N5988	6
	TO-3	60	2N6057	2N6050	12
		80	2N6058	2N6051	12
		100	2N6059	2N6052	12
15 A	Case 90-05	40	MJE1660	MJE1290	6
		60	MJE1661	MJE1291	6
	TO-3	40	MJ2801	MJ2901	1
		60	2N5881	2N5879	1
		80	2N5882	2N5880	1
		60	2N3055	MJ2955	1
16 A	TO-3	60	MJ4033	MJ4030	12
		80	MJ4034	MJ4031	12
		100	MJ4035	MJ4032	12
		100	2N5629	2N6029	1
		120	2N5630	2N6030	1
		140	2N5631	2N6031	1
20 A	TO-3	80	2N5303	2N5745	1
		60	2N6282	2N6285	12
		80	2N6283	2N6286	12
		100	2N6284	2N6287	12
25 A	TO-3	60	2N5885	2N5883	1
		80	2N5886	2N5884	1
30 A	TO-3	40	2N5301	2N4398	1
		60	2N5302	2N4399	1
		90	MJ802	MJ4502	1
50 A	TO-3	60	2N5685	2N5683	1
		80	2N5686	2N5684	1

SILICON POWER TRANSISTORS (continued)

TABLE 1 – TO-3


Case 1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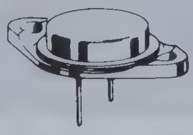
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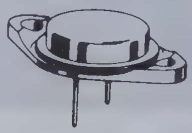

Case 197

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Case	Device Type
NPN									
40	4.0	30/200	1.0	1.2	3.0	87.5	4.0	11	MJ480
	5.0	20/180	1.0	1.5	5.0	87.5	4.0	11	2N5067
	5.0	25/100	2.5	1.5	5.0	87.5	4.0	11	2N4913
	15	15/60	8.0	1.5	8.0	115	1.0	11	MJ2801
	20	15/75	8.0	0.7	8.0	150	0.2	11	2N6257
	20	15/75	8.0	0.7	8.0	200	40	11	MJ6257
	30	16/60	15	3.0	30	200	2.0	12	2N5301
	30	15/60	15	2.0	15	150	0.2	11	2N3771
	30	15/60	15	1.0	15	150	2.0	11	MJ3771
45	15	20/70	3.0	4.0	15	115	–	11	2N6253
55	10	20/70	4.0	1.1	4.0	115	1.0	11	2N3235
60	4.0	30/200	1.0	1.2	3.0	87.5	4.0	11	MJ481
	5.0	20/80	1.0	1.5	5.0	87.5	4.0	11	2N5068
	5.0	20/100	1.5	1.0	2.0	87.5	4.0	11	2N5869
	5.0	25/100	2.5	1.5	5.0	87.5	4.0	11	2N4914
	7.0	20/100	2.5	1.0	4.0	100	4.0	11	2N5873
	7.5	15/75	3.0	2.5	3.0	115	1.0	11	2N3232
	7.5	20/60	3.0	1.5	3.0	115	10	11	2N3445
	7.5	40/120	5.0	1.5	5.0	115	10	11	2N3447
	10	15/–	3.0	1.0	5.0	150	2.5	11	2N3713
	10	20/100	4.0	1.0	5.0	150	4.0	11	2N5877
	10	20/100	3.0	–	–	150	2.0	11	MJ2840
	10	30/–	3.0	0.8	5.0	150	2.5	11	2N3715
	15	20/70	4.0	8.0	10	115	1.0	11	2N3055
	15	20/100	6.0	1.0	7.0	160	4.0	11	2N5881
	20	15/60	10	1.4	10	150	0.2	11	2N3772
	20	15/60	10	1.0	10	150	2.0	11	MJ3772
	25	20/100	10	1.0	15	200	4.0	11	2N5885
	30	15/60	15	3.0	30	200	2.0	12	2N5302
	50	15/60	25	1.0	25	300	2.0	197	2N5685
80	5.0	20/80	1.0	1.5	5.0	87.5	4.0	11	2N5069
	5.0	20/100	1.5	1.0	2.0	87.5	4.0	11	2N5870
	5.0	25/100	2.5	1.5	5.0	87.5	4.0	11	2N4915
	7.0	20/100	2.5	1.0	4.0	100	4.0	11	2N5874
	7.5	20/60	3.0	1.5	3.0	115	10	11	2N3446
	7.5	40/120	5.0	1.5	5.0	115	10	11	2N3448
	10	15/–	3.0	1.0	5.0	150	2.5	11	2N3714
	10	20/100	4.0	1.0	5.0	150	4.0	11	2N5878
	10	20/100	4.0	–	–	150	2.0	11	MJ2841
	10	30/–	3.0	0.8	5.0	150	2.5	11	2N3716
	16	15/60	8.0	1.4	8.0	150	200K	11	2N6359
	15	20/70	5.0	4.0	15	150	–	11	2N6254
	15	20/100	6.0	1.0	7.0	160	4.0	11	2N5882
	20	15/60	10	2.0	20	200	2.0	12	2N5303
	25	20/100	10	1.0	15	200	4.0	11	2N5886
	50	15/60	25	1.0	25	300	2.0	197	2N5686
90	30	25/100	7.5	0.8	7.5	200	–	12	MJ802
100	6.0	25/100	3.0	1.0	3.0	150	1.0	11	2N5758
	10	25/100	5.0	2.0	10	150	1.0	11	2N5632
	12	15/60	6.0	1.0	6.0	150	200K	11	2N6360
	16	25/100	8.0	1.0	10	200	1.0	11	2N5629
	25	30/120	10	1.0	10	200	40	11	2N6338
	50	30/120	20	1.0	20	250	30	197	2N6274
120	5.0	15/60	2.0	1.0	2.0	100	200	1	2N4348
120	6.0	20/80	3.0	1.0	3.0	150	1.0	11	2N5759
120	10	15/60	5.0	2.0	10	120	0.2	11	2N4348

TABLE 1 (continued)

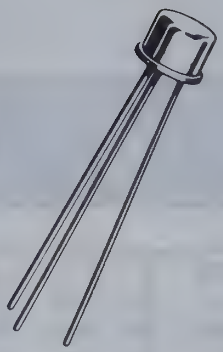
BV_{CER}* BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min Typ #	Case	Device Type
NPN									
120	10	20/80	4.0	2.0	10	150	1.0	11	2N5633
	16	15/60	8.0	0.8	8.0	150	0.2	11	2N6302
	16	15/60	8.0	0.8	8.0	200	1.0	11	MJ6302
	16	20/80	8.0	1.0	10	200	1.0	11	2N5630
	25	30/120	10	1.0	10	200	40	11	2N6339
	50	30/120	20	1.0	20	250	30	197	2N6275
140	6.0	15/60	3.0	1.0	3.0	150	1.0	11	2N5760
	10	15/60	5.0	2.0	10	150	1.0	11	2N5634
	10	7.5/–	10	5.0	10	117	80	1	2N3442
	16	15/60	8.0	4.0	16	150	0.8	11	2N3773
	16	15/60	8.0	1.0	10	200	1.0	11	2N5631
	25	30/120	10	1.0	10	200	40	11	2N6340
	50	30/120	20	1.0	20	250	30	197	2N6276
150	10	20/70	3.0	0.5	3.0	150	80	1	2N6262
150	25	30/120	10	1.0	10	200	40	11	2N6341
150	50	30/120	20	1.0	20	250	30	197	2N6277
200	5.0	30/90	1.0	0.8	1.0	100	2.5	11	MJ410
250	3.5	30/–	0.4	–	–	125	–	11	MJ3029
	5.0	40/120	0.4	–	–	100	–	11	MJ1800
	6.0	–	–	6.0	5.5	80	7.5	11	MJ3260
	8.0	15/75	3.0	0.8	3.0	125	5.0	11	2N6306
275	2.0	25/–	0.25	–	–	80	–	11	MJ3026
300	2.0	25/–	0.25	–	–	80	–	11	MJ3027
	3.5	25/–	0.3	–	–	100	–	11	MJ3028
	5.0	15/45	2.5	0.9	2.5	125	2.5	11	MJ3430
	5.0	30/90	1.0	0.8	1.0	100	2.5	11	MJ411
	8.0	15/75	3.0	0.8	3.0	125	5.0	11	2N6307
325	2.0	20/180	0.5	1.0	1.5	100	–	11	2N3788
	3.5	3.75/–	3.0	2.0	3.0	125	–	11	MJ3030
	10	15/35	2.5	0.7	2.5	125	2.5	11	MJ431
	10	30/90	1.0	0.8	1.0	125	2.5	11	MJ423
	10	–	–	2.0	6.0	125	–	11	MJ9000
	10	20/80	0.5	0.8	0.5	125	–	11	MJ413
350	5.0	30/90	1.0	0.8	1.0	100	2.5	11	MJ424
350	8.0	12/60	3.0	1.0	3.0	125	50	11	2N6308
400	3.5	30/90	1.0	2.5	2.5	100	2.8	11	2N3902
	5.0	15/35	2.5	0.7	2.5	125	2.5	11	2N5241
	5.0	30/90	1.0	0.8	1.0	100	2.5	11	MJ425
500	3.5	30/90	1.0	2.5	3.5	100	2.8	11	2N5157
1300*	5.0	–	–	5.0	4.5	56	7.5#	11	MJ3480
1400*	2.5	–	–	5.0	2.5	10	7.5#	11	MJ105
1500*	2.5	–	–	5.0	2.5	10	7.5#	11	BU105
1500*	5.0	–	–	5.0	4.5	56	7.5#	11	BU108
PNP									
30	3.0	20/60	1.0	1.5	3.0	25	60	1	2N3021
30	3.0	50/180	1.0	1.0	3.0	25	60	1	2N3024
40	4.0	30/200	1.0	1.2	3.0	87.5	4.0	11	MJ490
	5.0	20/80	1.0	1.5	5.0	87.5	4.0	11	2N4901
	5.0	20/100	4.0	1.0	4.0	150	3.0	11	MJ2267
	5.0	25/100	2.5	1.5	5.0	87.5	4.0	11	2N4904
	15	15/60	8.0	1.5	8.0	115	1.0	11	MJ2901
	30	15/60	15	2.0	20	200	4.0	12	2N4398
	30	20/–	10	1.0	10	150	2.0	12	MJ450
45	3.0	20/60	1.0	1.5	3.0	25	60	1	2N3022
45	3.0	50/180	1.0	1.0	3.0	25	60	1	2N3025
55	5.0	20/100	4.0	1.0	4.0	150	3.0	11	MJ2268
60	3.0	20/60	1.0	1.5	3.0	25	60	1	2N3023
	3.0	50/180	1.0	1.0	3.0	25	60	1	2N3026
	4.0	30/200	1.0	1.2	3.0	87.5	4.0	11	MJ491
	5.0	20/80	1.0	1.5	5.0	87.5	4.0	11	2N4902
	5.0	20/100	1.5	1.0	2.0	87.5	4.0	11	2N5867
	5.0	25/100	2.5	1.5	5.0	87.5	4.0	11	2N4905

SILICON POWER TRANSISTORS (continued)

TABLE 1 (continued)

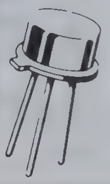
BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Case	Device Type
PNP									
60	7.0	20/100	2.5	1.0	4.0	100	4.0	11	2N5871
	10	15/–	3.0	1.0	4.0	150	4.0	11	2N3789
	10	20/100	3.0	–	–	150	4.0	11	MJ2940
	10	20/100	4.0	1.0	5.0	150	4.0	11	2N5875
	10	30/–	3.0	1.0	5.0	150	4.0	11	2N3791
	15	20/70	4.0	1.1	4.0	150	4.0	11	MJ2955
	15	20/100	6.0	1.0	7.0	160	4.0	11	2N5879
	16	1000/–	10	2.5	10	150	–	11	MJ4030
	25	20/100	10	1.0	15	200	4.0	11	2N5883
	30	15/60	15	2.0	20	200	4.0	12	2N4399
	50	15/60	25	1.0	25	300	2.0	197	2N5683
80	5.0	20/80	1.0	1.5	3.0	87.5	4.0	11	2N4903
	5.0	20/100	1.5	1.0	2.0	87.5	4.0	11	2N5868
	5.0	25/100	2.5	1.5	5.0	87.5	4.0	11	2N4906
	7.0	20/100	2.5	1.0	4.0	100	4.0	11	2N5872
	10	15/–	3.0	1.0	4.0	150	4.0	11	2N3790
	10	20/100	4.0	–	–	150	4.0	11	MJ2941
	10	20/100	4.0	1.0	5.0	150	4.0	11	2N5876
	10	30/–	3.0	1.0	5.0	150	4.0	11	2N3792
	15	20/100	6.0	1.0	7.0	160	4.0	11	2N5880
	20	15/60	10	2.0	20	200	2.0	12	2N5745
	25	20/100	10	1.0	15	200	4.0	11	2N5884
	50	15/60	25	1.0	25	300	2.0	197	2N5684
	50	30/120	20	1.0	20	250	30	197	2N6377
90	30	25/100	7.5	0.8	7.5	200	–	12	MJ4502
100	6.0	25/100	3.0	1.0	3.0	150	1.0	11	2N6226
	10	25/100	5.0	1.0	7.5	150	1.0	11	2N6229
	16	25/100	8.0	1.0	10	200	1.0	11	2N6029
	50	30/120	20	1.0	20	250	30	197	2N6378
120	6.0	20/80	3.0	1.0	3.0	150	1.0	11	2N6227
	10	20/80	5.0	1.0	7.5	150	1.0	11	2N6230
	16	20/80	8.0	1.0	10	200	1.0	11	2N6030
	50	30/120	20	1.0	20	250	30	197	2N6379
140	6.0	15/60	3.0	1.0	3.0	150	1.0	11	2N6228
	10	15/60	5.0	1.0	7.5	150	1.0	11	2N6231
	16	15/60	8.0	1.0	10	200	1.0	11	2N6031

TABLE 2 – TO-5 Case 31 (1)



BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
40	1.0	30/150	0.25	0.6	1.0	6.0	1.0	2N4237
60	1.0	30/150	0.25	0.6	1.0	6.0	1.0	2N4238
80	1.0	30/150	0.25	0.6	1.0	6.0	1.0	2N4239
100	1.0	40/150	0.25	0.6	0.25	10	30	2N5681
120	1.0	40/150	0.25	0.6	0.25	10	30	2N5682
250	0.1	25/250	0.03	5.0	0.03	0.8	15	MJ420
250	1.0	40/160	0.02	0.5	0.05	5.0	15	2N3440
325	0.1	25/250	0.03	5.0	0.03	0.8	15	MJ421
350	1.0	40/160	0.02	0.5	0.05	5.0	15	2N3439
PNP								
40	1.0	30/150	0.25	0.6	1.0	6.0	3.0	2N4234
40	3.0	25/180	1.0	1.5	3.0	6.0	60	2N3719
40	3.0	40/200	1.5	1.3	2.5	6.0	60	2N3867
60	1.0	30/150	0.25	0.6	1.0	6.0	3.0	2N4235
60	3.0	25/180	1.0	1.5	3.0	6.0	60	2N3720
60	3.0	30/150	1.5	1.3	2.5	6.0	60	2N3868
80	1.0	30/150	0.25	0.6	1.0	6.0	3.0	2N4236
80	3.0	30/150	1.5	0.75	1.5	6.0	60	2N6303
100	1.0	40/150	0.25	0.6	0.25	10	30	2N5679
120	1.0	40/150	0.25	0.6	0.25	10	30	2N5680

TABLE 3 – TO-39 Case 79(1)



BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
60	3.0	30/150	1.0	0.7	2.0	6.0	40	2N5334
60	4.0	20/100	4.0	1.0	4.0	10	4.0	2N4877
80	3.0	30/150	1.0	0.7	2.0	6.0	40	2N5335
80	5.0	30/120	2.0	1.2	5.0	6.0	30	2N5336
80	5.0	60/240	2.0	1.2	5.0	6.0	30	2N5337
100	5.0	30/120	2.0	1.2	5.0	6.0	30	2N5338
100	5.0	60/240	2.0	1.2	5.0	6.0	30	2N5339
PNP								
60	5.0	25/180	2.0	1.2	5.0	10	30	MJ8100
80	5.0	25/180	2.0	1.2	5.0	10	30	MJ8101
80	5.0	30/120	2.0	0.7	2.0	10	30	2N6190
80	5.0	60/240	2.0	0.7	2.0	10	30	2N6191
100	5.0	30/120	2.0	0.7	2.0	10	30	2N6192
100	5.0	60/240	2.0	0.7	2.0	10	30	2N6193
200	1.0	20/–	0.5	1.0	0.5	5.0	40	MJ4645
200	1.0	30/150	0.05	2.5	0.05	10	15	MJ5415
300	1.0	30/120	0.05	2.5	0.05	10	15	MJ5416
300	1.0	20/–	0.5	1.2	0.5	5.0	40	MJ4646
400	1.0	20/–	0.5	1.5	0.5	5.0	30	MJ4647
350	1.0	20/–	0.5	1.5	0.5	5.0	30	MJ4648

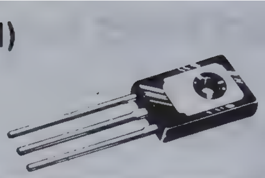
TABLE 4 – TO-66 Case 80-02

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
40	1.0	20/100	0.5	0.6	1.0	25	3.0	2N4910
40	2.0	25/200	0.5	1.0	0.5	20	15	MJ3101
40	4.0	25/150	1.5	2.0	3.0	35	4.0	2N4231
55	4.0	25/100	0.5	1.0	0.5	25	4.0	2N3054
55	4.0	25/100	0.5	1.0	0.5	75	3.0	2N3054A
60	1.0	20/100	0.5	0.6	1.0	25	3.0	2N4911
↓	2.0	25/200	0.5	1.0	0.5	20	15	MJ2249
↓	3.0	40/160	0.5	2.5	1.0	20	10	2N3766
↓	4.0	25/150	1.5	2.0	3.0	35	4.0	2N4232
↓	7.0	20/100	2.5	1.0	4.0	90	4.0	2N6315
80	1.0	20/100	0.5	0.6	1.0	25	3.0	2N4912
↓	2.0	25/200	0.5	1.0	0.5	20	15	MJ2250
↓	3.0	40/160	0.5	2.5	1.0	20	10	2N3767
↓	4.0	25/150	1.5	2.0	3.0	35	4.0	2N4233
↓	7.0	20/100	2.5	1.0	4.0	90	4.0	2N6316
↓	7.0	30/120	2.0	1.2	7.0	40	30	2N5427
↓	7.0	60/240	2.0	1.2	7.0	40	30	2N5428
100	7.0	30/120	2.0	1.2	7.0	40	30	2N5429
100	7.0	60/240	2.0	1.2	7.0	40	30	2N5430
125	2.0	25/100	0.75	1.0	0.75	40	10	2N5050
140	3.0	20/80	0.5	6.0	2.7	25	0.2	2N3441
150	2.0	25/100	0.75	1.0	0.75	40	10	2N5051
175	1.0	40/200	0.5	5.0	1.0	35	10	2N3583
200	2.0	25/100	0.75	1.0	0.75	40	10	2N5052
225	0.5	25/200	0.05	–	–	10*	10	MJ2251
225	0.1	30/200	0.05	5.0	0.05	15	15	MJ3201
225	0.25	40/200	0.1	2.5	0.25	20	10	2N3738
225	5.0	25/125	1.0	0.5	1.0	50	20	2N6233
250	1.0	40/160	0.02	0.5	0.05	5.0	15	2N3440
250	2.0	8.0/80	0.75	0.75	1.0	35	10	2N3584
275	5.0	25/125	1.0	0.5	1.0	50	20	2N6234
300	0.1	30/200	0.05	5.0	0.05	15	15	MJ3202
300	0.5	25/200	0.05	–	–	10*	10	MJ2252
300	0.25	40/200	0.1	2.5	0.25	20	10	2N3739
300	2.0	8.0/80	1.0	0.75	1.0	35	10	2N3585
300	2.0	10/100	0.75	1.0	0.75	35	15	2N4240
325	0.25	30/300	0.05	5.0	0.05	6.67*	15	MJ400
325	5.0	25/125	1.0	0.5	1.0	50	20	2N6235
350	1.0	40/160	0.02	0.5	0.05	1.0	15	2N3439
PNP								
40	1.0	20/100	0.5	0.6	1.0	25	3.0	2N4898
40	3.0	20/100	0.25	0.6	1.0	25	3.0	MJ3701
55	4.0	25/100	0.5	0.5	0.5	75	3.0	2N6049
60	1.0	20/100	0.5	0.6	1.0	25	3.0	2N4899
↓	1.0	30/100	0.25	0.6	1.0	25	4.0	2N3740
↓	3.0	20/100	0.25	0.6	1.0	25	3.0	MJ2253
↓	7.0	20/100	2.5	1.0	4.0	90	4.0	2N6317
↓	1.0	20/100	0.5	0.6	1.0	25	3.0	2N4900
↓	1.0	30/100	0.25	0.6	1.0	25	4.0	2N3741
↓	3.0	20/100	0.25	0.6	1.0	25	3.0	MJ2254
↓	70	20/100	2.5	1.0	4.0	90	4.0	2N6318
175	1.0	40/200	0.5	5.0	1.0	35	10	MJ3583
225	0.25	40/200	0.1	2.5	0.25	20	10	MJ3738
250	1.0	25/100	0.5	3.0	1.0	40	60	2N5344
250	2.0	8.0/80	0.75	0.75	1.0	35	10	MJ3584
300	0.25	40/200	0.1	2.5	0.25	20	10	MJ3739
300	1.0	25/100	0.5	3.0	1.0	40	60	2N5345
300	2.0	8.0/80	1.0	0.75	1.0	35	10	MJ3585
300	2.0	10/100	0.75	1.0	0.75	35	10	MJ4240

* @ $T_C = 70^\circ C$

SILICON POWER TRANSISTORS (continued)

TABLE 5 – Case 77-03



NPN

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Case Style	Device Type
25	5.0	45/180	2.0	0.75	2.0	15	65	1	MJE200
30	3.0	25/–	1.0	–	–	25	–	1	MJE520
30	3.0	25/–	1.0	–	–	40	–	3	MJE3520
40	1.5	40/–	0.15	0.15	0.15	2.0	–	1	MJE720
40	3.0	20/100	0.5	0.6	1.0	30	3.0	1	2N4921
40	3.0	50/250	0.1	0.3	0.5	12.5	50	1	MJE180
	4.0	40/200	0.2	0.3	0.5	15	50	1	MJE220
	4.0	40/150	0.2	0.3	0.5	15	50	1	MJE221
	4.0	40/–	1.0	–	–	40	–	1	MJE521
	4.0	40/–	1.0	–	–	40	–	3	MJE3521
	4.0	25/100	1.5	1.4	4.0	40	2.0	1	2N5190
	4.0	25/–	1.0	0.3	0.5	15	50	1	MJE222
60	1.5	40/–	0.15	0.15	0.15	20	–	1	MJE721
	3.0	20/100	0.5	0.6	1.0	30	3.0	1	2N4922
	3.0	50/250	0.1	0.3	0.5	12.5	50	1	MJE181
	4.0	40/200	0.2	0.3	0.5	15	50	1	MJE223
	4.0	40/150	0.2	0.3	0.5	15	50	1	MJE224
	4.0	25/100	1.5	1.4	4.0	40	2.0	1	2N5191
	4.0	25/–	1.0	0.3	0.5	15	50	1	MJE225
80	1.5	40/–	0.15	0.15	0.15	20	–	1	MJE722
	3.0	20/100	0.5	0.6	1.0	30	3.0	1	2N4923
	3.0	50/250	0.1	0.3	0.5	12.5	50	1	MJE182
	4.0	20/80	1.5	1.4	4.0	40	2.0	1	2N5192
	4.0	25/–	0.2	0.3	0.5	15	40	1	MJE242
	4.0	40/120	0.2	0.3	0.5	15	40	1	MJE241
	4.0	40/200	0.2	0.3	0.5	15	40	1	MJE240
100	4.0	25/–	0.2	0.3	0.5	15	40	1	MJE244
100	4.0	40/120	0.2	0.3	0.5	15	40	1	MJE243
150	0.5	25/200	0.05	1.0	0.05	20.8	15	1	MJE341
200	0.5	30/300	0.05	1.0	0.05	20.8	15	1	MJE344
250	0.3	40/160	0.02	0.5	0.05	15	15	1	MJE3440
250	0.5	30/250	0.1	1.0	0.1	20	10	1	2N5655
300	0.5	30/240	0.05	–	–	20.8	–	1	MJE340
300	0.5	30/250	0.1	1.0	0.1	20	10	1	2N5656
325	0.5	30/300	0.05	5.0	0.05	20.8	15	1	MJE345
350	0.3	40/160	0.02	0.5	0.05	15	15	1	MJE3439
350	0.5	30/250	0.1	1.0	0.1	20	10	1	2N5657

PNP

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Case Style	Device Type
25	5.0	45/180	2.0	0.75	20	15	65	1	MJE210
30	3.0	25/–	1.0	–	–	25	–	1	MJE370
30	3.0	25/–	1.0	–	–	25	–	3	MJE3370
40	1.5	40/–	0.15	0.15	0.15	20	–	1	MJE710
	3.0	20/100	0.5	0.6	1.0	30	3.0	1	2N4918
	4.0	40/200	0.2	0.3	0.5	15	50	1	MJE230
	4.0	40/150	0.2	0.3	0.5	15	50	1	MJE231
	4.0	40/–	1.0	–	–	40	–	1	MJE371
	4.0	40/–	1.0	–	–	40	–	3	MJE3371
	4.0	25/100	1.5	1.2	4.0	40	2.0	1	2N5193
	4.0	25/–	1.0	0.3	0.5	15	50	1	MJE232
	3.0	50/250	0.1	0.3	0.5	12.5	50	1	MJE170
60	1.5	40/–	0.15	0.15	0.15	20	–	1	MJE711
	3.0	20/100	0.5	0.6	1.0	30	3.0	1	2N4919
	3.0	50/250	0.1	0.3	0.5	12.5	50	1	MJE171
	4.0	40/200	0.2	0.3	0.5	15	50	1	MJE233
	4.0	40/150	0.2	0.3	0.5	15	50	1	MJE234
	4.0	25/100	1.5	1.2	4.0	40	2.0	1	2N5194
	4.0	25/–	1.0	0.3	0.5	15	50	1	MJE235
80	1.5	40/–	0.15	0.15	0.15	20	–	1	MJE712
	3.0	20/100	0.5	0.6	1.0	30	3.0	1	2N4920
	3.0	50/250	0.1	0.3	0.5	12.5	50	1	MJE172
	4.0	20/80	1.5	1.2	4.0	40	2.0	1	2N5195
	4.0	25/–	0.2	0.3	0.5	15	40	1	MJE252
80	4.0	40/120	0.2	0.3	0.5	15	40	1	MJE251

TABLE 5 (continued) – Case 77-03

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Case Style	Device Type
PNP									
80	4.0	40/200	0.2	0.3	0.5	15	40	1	MJE250
100	4.0	25/–	0.2	0.3	0.5	15	40	1	MJE254
100	4.0	40/120	0.2	0.3	0.5	15	40	1	MJE253

TABLE 6 – Case 90-05

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
40	5.0	20/120	2.5	0.6	2.5	75	2.0	2N5977
40	8.0	20/120	4.0	0.6	4.0	90	2.0	2N5983
40	12	20/120	6.0	0.7	6.0	100	2.0	2N5989
40	15	20/100	5.0	1.8	15	90	3.0	MJE1660
50	5.0	25/100	2.0	–	–	65	–	MJE205
60	5.0	20/120	2.5	0.6	2.5	75	2.0	2N5978
60	8.0	20/120	4.0	0.6	4.0	90	2.0	2N5984
60	10	20/70	4.0	8.0	10	90	2.0	MJE3055
60	10	25/100	3.0	–	–	90	–	MJE2801
60	15	20/100	5.0	1.8	15	90	3.0	MJE1661
60	12	20/120	6.0	0.7	6.0	100	2.0	2N5990
80	5.0	20/120	2.5	0.6	2.5	75	2.0	2N5979
80	8.0	20/120	4.0	0.6	4.0	90	2.0	2N5985
80	12	20/120	6.0	0.7	6.0	100	2.0	2N5991
PNP								
40	5.0	20/120	2.5	0.6	2.5	75	2.0	2N5974
40	8.0	20/120	4.0	0.6	4.0	90	2.0	2N5980
40	12	20/120	6.0	0.7	6.0	100	2.0	2N5986
40	15	20/100	5.0	1.8	15	90	3.0	MJE1290
50	5.0	25/100	2.0	–	–	65	–	MJE105
60	5.0	20/120	2.5	0.6	2.5	75	2.0	2N5975
60	8.0	20/120	4.0	0.6	4.0	90	2.0	2N5981
60	10	20/70	4.0	8.0	10	90	2.0	MJE2955
60	10	25/100	3.0	–	–	90	–	MJE2901
60	12	20/120	6.0	0.7	6.0	100	2.0	2N5987
60	15	20/100	5.0	1.8	15	90	3.0	MJE1291
80	5.0	20/120	2.5	0.6	2.4	75	2.0	2N5976
80	8.0	20/120	4.0	0.6	4.0	90	2.0	2N5982
80	12	20/120	6.0	0.7	6.0	100	2.0	2N5988

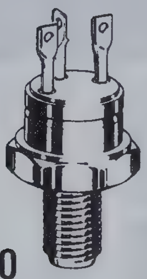
TABLE 7 – Case 199-04

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
30	30	25/–	1.0	–	–	40	–	MJE520K
40	3.0	20/100	0.5	0.6	1.0	40	3.0	MJE4921
40	3.0	20/100	1.0	0.6	1.0	40	3.0	MJE2522
40	3.0	40/200	0.2	0.7	1.0	40	3.0	MJE2520
40	4.0	20/100	1.5	0.7	1.5	60	2.0	MJE2480
40	4.0	20/100	2.5	0.7	1.5	60	2.0	MJE2482
40	4.0	25/100	1.5	0.6	1.5	60	2.0	MJE5190
40	4.0	40/–	1.0	–	–	60	–	MJE521K
40	5.0	20/120	2.5	0.6	2.5	75	2.0	MJE5977
40	5.0	25/125	1.0	1.0	3.5	80	3.0	MJE2020
40	8.0	20/120	4.0	0.6	4.0	90	2.0	MJE5983
50	5.0	25/100	2.0	–	–	65	–	MJE205K
55	4.0	25/100	0.5	1.0	0.5	40	–	MJE3054
60	3.0	20/100	0.5	0.6	1.0	40	3.0	MJE4922
60	3.0	20/100	1.0	0.6	1.0	40	3.0	MJE2523
60	3.0	40/200	0.2	0.7	1.0	40	3.0	MJE2521
60	4.0	20/100	1.5	0.7	1.5	60	2.0	MJE2481
60	4.0	20/100	2.5	0.7	1.5	60	2.0	MJE2483
60	4.0	25/100	1.5	0.6	1.5	60	2.0	MJE5191
60	5.0	20/100	2.5	0.6	2.5	75	2.0	MJE5978
60	5.0	25/125	1.0	1.0	3.5	80	3.0	MJE2021
60	8.0	20/120	4.0	0.6	4.0	90	2.0	MJE5984
60	10	20/70	4.0	1.1	4.0	90	2.0	MJE3055K
60	10	25/100	3.0	–	–	90	–	MJE2801K
80	3.0	20/100	0.5	0.6	1.0	40	3.0	MJE4923
80	4.0	20/80	1.5	0.6	1.5	60	2.0	MJE5192
80	5.0	20/120	2.5	0.6	2.5	75	2.0	MJE5979
80	8.0	20/120	4.0	0.6	4.0	90	2.0	MJE5985
150	0.5	25/200	0.05	1.0	0.05	30	15	MJE341K
200	0.5	30/300	0.05	1.0	0.05	30	15	MJE344K
225	0.5	40/200	0.1	2.5	0.25	30	10*	MJE3738
250	0.5	30/250	0.1	1.0	0.1	30	10	MJE5655
300	0.5	30/250	0.1	1.0	0.1	30	10	MJE5656
300	0.5	30/240	0.05	–	–	30	–	MJE340K
300	0.5	40/200	0.1	2.5	0.25	30	10*	MJE3739
300	1.5	30/240	0.5	3.5	0.5	50	–	MJE2160
350	0.5	25/200	0.05	1.5	0.1	30	10*	MJE2360
350	0.5	30/250	0.1	1.0	0.1	30	10	MJE5657
350	0.5	50/250	0.05	1.5	0.1	30	10*	MJE2361
PNP								
30	3.0	25/–	1.0	–	–	40	–	MJE370K
40	3.0	20/100	0.5	0.6	1.0	40	3.0	MJE4918
40	3.0	20/100	1.0	0.6	1.0	60	3.0	MJE2490
40	3.0	40/200	0.2	0.7	1.0	40	3.0	MJE2370
40	4.0	25/100	1.5	0.6	1.5	60	2.0	MJE5193
40	4.0	40/–	1.0	–	–	60	–	MJE371K
40	5.0	20/120	2.5	0.6	2.5	75	2.0	MJE5974
40	5.0	25/125	1.0	1.0	3.5	80	3.0	MJE2010
40	8.0	20/120	4.0	0.6	4.0	90	2.0	MJE5980
50	5.0	25/100	2.0	–	–	65	–	MJE105K
60	3.0	20/100	0.5	0.6	1.0	40	3.0	MJE4919
60	3.0	20/100	1.0	0.6	1.0	60	3.0	MJE2491
60	3.0	40/200	0.2	0.7	1.0	40	3.0	MJE2371
60	4.0	25/100	1.5	0.6	1.5	60	2.0	MJE5194
60	4.0	30/100	0.25	0.6	1.0	40	4.0	MJE3740

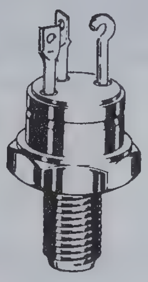
TABLE 7 (continued) – Case 199-04

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
60	5.0	20/120	2.5	0.6	2.5	75	2.0	MJE5975
60	5.0	25/125	1.0	1.0	3.5	80	3.0	MJE2011
60	8.0	20/120	4.0	0.6	4.0	90	2.0	MJE5981
60	10	20/70	4.0	1.1	4.0	90	2.0	MJE2955K
60	10	25/100	3.0	–	–	90	–	MJE2901K
80	3.0	20/100	0.5	0.6	1.0	40	3.0	MJE4920
80	4.0	20/80	1.5	0.6	1.5	60	2.0	MJE5195
80	4.0	30/100	0.25	0.6	1.0	40	4.0	MJE3741
80	5.0	20/120	2.5	0.6	2.5	75	2.0	MJE5976
80	8.0	20/120	4.0	0.6	4.0	90	2.0	MJE5982

TABLE 8 – TO-59



Case 160



Case 160A

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Case	Device Type
NPN									
80	7.0	30/120	2.0	1.2	7.0	60	30	160	2N5346
80	7.0	30/120	2.0	1.2	7.0	60	30	160A	2N5477
80	7.0	60/240	2.0	1.2	7.0	60	30	160	2N5347
80	7.0	60/240	2.0	1.2	7.0	60	30	160A	2N5478
100	7.0	30/120	2.0	1.2	7.0	60	30	160	2N5348
100	7.0	30/120	2.0	1.2	7.0	60	30	160A	2N5479
100	7.0	60/240	2.0	1.2	7.0	60	30	160	2N5349
100	7.0	60/240	2.0	1.2	7.0	60	30	160A	2N5480
PNP									
60	7.0	25/180	2.0	0.7	2.0	60	30	160A	MJ500
60	7.0	25/180	2.0	0.7	2.0	60	30	160	MJ6700
80	7.0	25/180	2.0	0.7	2.0	60	30	160A	MJ501
80	7.0	25/180	2.0	0.7	2.0	60	30	160	MJ6701
80	10	30/120	2.0	0.7	2.0	60	30	160A	2N6182
80	10	60/240	2.0	0.7	2.0	60	30	160A	2N6183
80	10	30/120	2.0	0.7	2.0	60	30	160	2N6186
80	10	60/240	2.0	0.7	2.0	60	30	160	2N6187
100	10	30/120	2.0	0.7	2.0	60	30	160A	2N6184
100	10	60/240	2.0	0.7	2.0	60	30	160A	2N6185
100	10	30/120	2.0	0.7	2.0	60	30	160	2N6188
100	10	60/240	2.0	0.7	2.0	60	30	160	2N6189

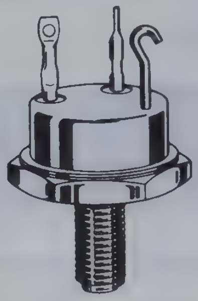


TABLE 9 – TO-61 Case 9

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} @ Min/Max	I_C Amp	$V_{CE(sat)}$ @ Volts Max	I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
40	10	30/120	2.0	0.4	2.0	25	100	2N5304
80	5.0	20/90	2.0	1.0	2.0	115	10	2N1724
80	5.0	50/150	2.0	1.0	2.0	115	10	2N1725
80	7.5	20/60	3.0	1.2	3.0	115	10	2N3487
80	7.5	40/120	5.0	1.0	3.0	115	10	2N3490
100	7.5	20/60	3.0	1.2	3.0	115	10	2N3488
100	7.5	40/120	5.0	1.0	3.0	115	10	2N3491
120	7.5	15/45	3.0	1.2	3.0	115	10	2N3489
120	7.5	30/90	5.0	1.0	3.0	115	10	2N3492

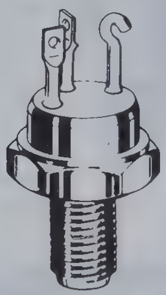


TABLE 10 – TO-63 Case 188

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} @ Min/Max	I_C Amp	$V_{CE(sat)}$ @ Volts Max	I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
100	30	20/100	10	1.0	10	150	30	MJ7000
100	50	30/120	20	1.2	20	250	30	2N6278
120	50	30/120	20	1.2	20	250	30	2N6279
140	50	30/120	20	1.2	20	250	30	2N6280
150	50	30/120	20	1.2	20	250	30	2N6281
PNP								
80	50	30/120	20	1.2	20	250		2N6380
100	50	30/120	20	1.2	20	250		2N6381
120	50	30/120	20	1.2	20	250		2N6382

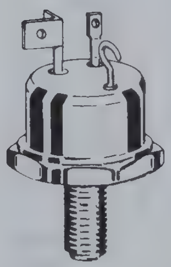
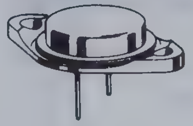
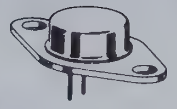


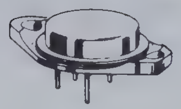
TABLE 11 – TO-114 Case 177

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} @ Min/Max	I_C Amp	$V_{CE(sat)}$ @ Volts Max	I_C Amp	P_D Watts	f_T MHz Min	Device Type
NPN								
80	60	20/100	20	1.0	20	300	20	MJ7200
100	60	20/100	20	1.0	20	300	20	MJ7201

TABLE 12
DARLINGTON TRANSISTORS
(Metal)


Case 11
(TO-3)

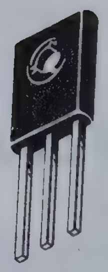

Case 80-02
(TO-66)


Case 253

BV_{CEO} Volts Max	I_C Amp Max	h_{FE} Min/Max	@ I_C Amp	$V_{CE(sat)}$ Volts Max	@ I_C Amp	P_D Watts	f_T MHz Min	Case	Device Type	
									NPN	PNP
40	15	500/–	4.0	2.5	4.0	150	–	11	MJ3520	–
40	20	500/5000	4.0	1.8	4.0	150	–	11	2N6355	–
40	20	1500/10000	4.0	1.8	4.0	150	–	11	2N6356	–
60	4.0	750/18000	2.0	2.0	2.0	50	4.0	253	MJ4200	MJ4210
60	4.0	750/18000	2.0	2.0	2.0	50	4.0	80-02	2N6294	2N6296
60	4.0	1000/–	1.5	2.0	1.5	75	–	11	MJ4000	MJ4010
60	8.0	750/18000	4.0	2.0	4.0	75	4.0	80-02	2N6300	2N6298
60	8.0	750/18000	4.0	2.0	4.0	100	4.0	11	2N6055	2N6053
60	8.0	750/18000	4.0	2.0	4.0	160	4.0	253	MJ1200	MJ920
60	8.0	1000/–	3.0	2.0	3.0	90	–	11	MJ1000	MJ900
60	10	1000/–	5.0	2.5	3.0	150	–	11	MJ3000	MJ2500
60	12	750/18000	6.0	2.0	6.0	150	4.0	11	2N6057	2N6050
60	16	1000/–	10	2.5	1.0	150	–	11	MJ4033	MJ4030
60	20	500/5000	4.0	1.8	4.0	150	–	11	2N6357	–
60	20	1500/1000	4.0	1.8	4.0	150	–	11	2N6358	–
60	20	750/18000	10	2.0	10	160	4.0	11	2N6282	2N6285
80	4.0	750/18000	2.0	2.0	2.0	50	4.0	253	MJ4201	MJ4211
80	4.0	750/18000	2.0	2.0	2.0	50	4.0	80-02	2N6295	2N6297
80	4.0	1000/–	1.5	2.0	1.5	75	–	11	MJ4001	MJ4011
80	8.0	750/18000	4.0	2.0	4.0	75	4.0	80-02	2N6301	2N6299
80	8.0	750/18000	4.0	2.0	4.0	100	4.0	11	2N6056	2N6054
80	8.0	750/18000	4.0	2.0	4.0	160	4.0	253	MJ1201	MJ921
80	8.0	1000/–	3.0	2.0	3.0	90	–	11	MJ1001	MJ901
80	10	1000/–	5.0	2.5	5.0	150	–	11	MJ3001	MJ2501
80	12	750/18000	6.0	2.0	6.0	150	4.0	11	2N6058	2N6051
80	15	500/–	4.0	1.8	4.0	150	–	11	MJ3521	–
80	16	1000/–	10	2.5	10	150	–	11	MJ4034	MJ4031
80	20	750/18000	10	2.0	10	160	4.0	11	2N6283	2N6286
100	12	750/18000	6.0	2.0	6.0	150	4.0	11	2N6059	2N6052
100	16	1000/–	10	2.5	10	150	–	11	MJ4035	MJ4032
100	20	750/18000	10	2.0	10	160	4.0	11	2N6284	2N6287
300	7.0	100/–	2.5	2.2	2.5	100	–	11	MJ3040	–
300	7.0	250/–	2.5	2.2	2.5	100	–	11	MJ3041	–
350	7.0	250/–	2.5	2.2	2.5	100	–	11	MJ3042	–

TABLE 13
DARLINGTON TRANSISTORS (Plastic)

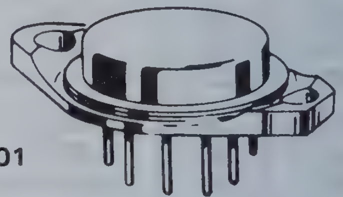
Case 199-04


Case 77-03

Case 90-05

BV$_{CEO}$ Volts Max	I$_C$ Amp Max	h$_{FE}$ Min/Max	@ I$_C$ Amp	V$_{CE(sat)}$ Volts Max	@ I$_C$ Amp	P$_D$ Watts	f$_T$ MHz Min	Case	Device Type NPN	Device Type PNP
40	4.0	750/15000	2.0	2.0	2.0	1.5	25	77-03	2N6037	2N6034
60	4.0	750/—	1.5	2.5	1.5	40	—	77-03	MJE800	MJE700
60	4.0	750/—	2.0	2.8	2.0	40	—	77-03	MJE801	MJE701
60	4.0	750/15000	2.0	2.0	2.0	1.5	25	77-03	2N6038	2N6035
60	5.0	750/—	3.0	2.5	3.0	70	1.0	90-05	MJE1100	MJE1090
60	5.0	750/—	4.0	2.8	4.0	70	1.0	90-05	MJE1101	MJE1091
60	5.0	750/—	3.0	2.5	3.0	70	—	199-04	MJE2100	MJE2090
60	5.0	750/—	3.0	2.5	3.0	70	—	199-04	MJE2101	MJE2091
60	8.0	1000/20000	4.0	2.0	4.0	75	—	199-04	2N6043	2N6040
60	8.0	1000/20000	4.0	2.0	4.0	75	—	90-05	MJE6043	MJE6040
80	4.0	750/—	1.5	2.5	1.5	40	—	77-03	MJE802	MJE702
80	4.0	750/—	2.0	2.8	2.0	40	—	77-03	MJE803	MJE703
80	5.0	750/—	3.0	2.5	3.0	70	1.0	90-05	MJE1102	MJE1092
80	5.0	750/—	4.0	2.8	4.0	70	1.0	90-05	MJE1103	MJE1093
80	4.0	750/15000	2.0	2.0	2.0	1.5	25	77-03	2N6039	2N6036
80	5.0	750/—	4.0	2.8	4.0	70	—	199-04	MJE2102	MJE2092
80	5.0	750/—	4.0	2.8	4.0	70	—	199-04	MJE2103	MJE2093
80	8.0	1000/20000	4.0	2.0	4.0	75	—	199-04	2N6044	2N6041
80	8.0	1000/20000	4.0	2.0	4.0	75	—	90-05	MJE6044	MJE6041
100	8.0	1000/20000	3.0	2.0	3.0	75	—	199-04	2N6045	2N6042
100	8.0	1000/20000	3.0	2.0	3.0	75	—	90-05	MJE6045	MJE6042

TABLE 14
HIGH POWER NPN SILICON POWER VOLTAGE REGULATOR


Case 662-01

V$_O$ Volts Min	V$_O$ Volts Max	I$_O$ mA Max	$\lvert V_{in}-V_O \rvert$ Volts Min	$\lvert V_{in}-V_O \rvert$ Volts Max	V$_{in}$ Volts Min	V$_{in}$ Volts Max	I$_{IB}$ mA Max	Reg$_{in}$ % V$_O$/V$_{in}$ Max	Reg$_L$ % V$_O$ Max	P$_D$ Watts Max	Device Type
–55 to +175°C Case Temperature											
2.0	35		3.0	60	9.5	40	5.0	0.5	0.6	100	MPC1000

PLASTIC-ENCAPSULATED SMALL-SIGNAL TRANSISTORS

Plastic-Encapsulated Small-Signal Silicon Transistors for Industrial Applications

This Selector Guide is designed to help you select the right silicon plastic transistor for your applications. A wide range of device types in two basic package configurations are listed in this Selector Guide.

The TO-92 — is the most popular, high-volume plastic package and will meet most of your high-performance, low-cost requirements.

The Uniwatt Package — is designed for applications requiring greater power dissipation than available with the TO-92 package.

Motorola plastic-encapsulated transistors offer the features that the design of industrial electronics equipment requires — reliability, performance, convenience and economy.

RELIABILITY has been well proven by extensive environmental and life testing, and the use of hundreds of millions of these transistors in industrial and consumer applications. Industrial plastic transistors are encapsulated by a high-temperature pressure-molded process that produces a rugged one-piece package resistant to humidity and shock. Ask us for our brochure entitled, "Some Plain Talk About Motorola's TO-92 Plastic Transistor Reliability."

PERFORMANCE is assured by careful design and testing. Geometric design and diffusion profiles are optimized to excel in specified applications such as high-speed switching, high-frequency amplification, and low-noise amplification. Motorola plastic transistors are 100% performance tested on high-speed, computer-controlled equipment, before shipment, to assure conformance to specifications.

CONVENIENCE in use is enhanced by a number of package variations — the popular D-shaped, Unibloc package which can dissipate 350 or 625 mW at an ambient temperature of 25°C, and Uniwatt package used for applications requiring up to 10 watts ($T_C = 25°C$) dissipation.

ECONOMY is a prime concern of the industrial designer. Motorola's highly efficient plastic product lines are the most advanced in the industry. Devices are produced by stripline techniques on highly mechanized equipment that reduces labor costs and provides high uniformity and quality.

Ask for Motorola's new comprehensive Designer's Manual entitled,
"Small-Signal Plastic Transistor Selector Guide and Cross Reference."

POWER DISSIPATION

Continuous package improvements have enhanced the power dissipation of Motorola's plastic encapsulated transistors. All devices in the nickel lead frame TO-92 package can now dissipate 350 mW in addition to the following:

P_D @ $T_A = 25°C = 350$ mW	P_D @ $T_C = 25°C = 1.0$ W
Derate above 25°C = 2.8 mW/°C	Derate above 25°C = 8.0 mW/°C
$\theta_{JA} = 0.125°C/mW$	$\theta_{JC} = 0.357°C/mW$

$T_J = -65$ to $+150°C$

All devices in the copper lead frame TO-92 package can now dissipate 625 mW in addition to the following:

P_D @ $T_A = 25°C = 625$ mW	P_D @ $T_C = 25°C = 1.5$ W
Derate above 25°C = 5.0 mW/°C	Derate above 25°C = 12 mW/°C
$\theta_{JA} = 200°C/W$	$\theta_{JC} = 83.3°C/W$

$T_J = -65$ to $+150°C$

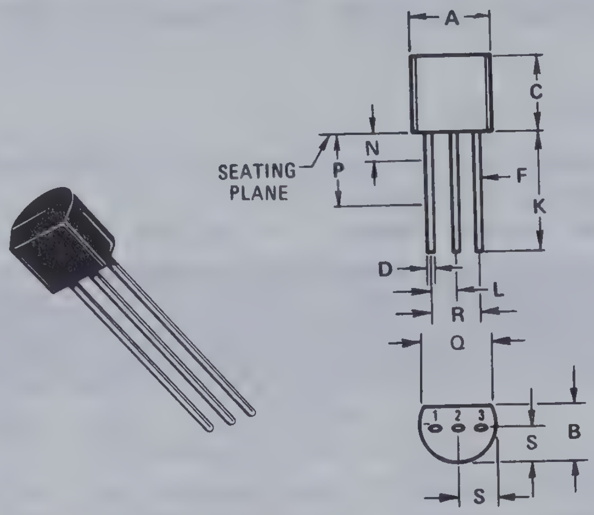
All devices in the Uniwatt package — Case 152 — can dissipate 1.0W in addition to the following:

P_D @ $T_A = 25°C = 1.0$ W	P_D @ $T_C = 25°C = 10$ W
Derate above 25°C = 8.0 mW/°C	Derate above 25°C = 80 mW/°C
$\theta_{JA} = 125°C/W$	$\theta_{JC} = 12.5°C/W$

$T_J = -55$ to $+150°C$

PLASTIC ENCAPSULATED SMALL-SIGNAL TRANSISTORS (continued)

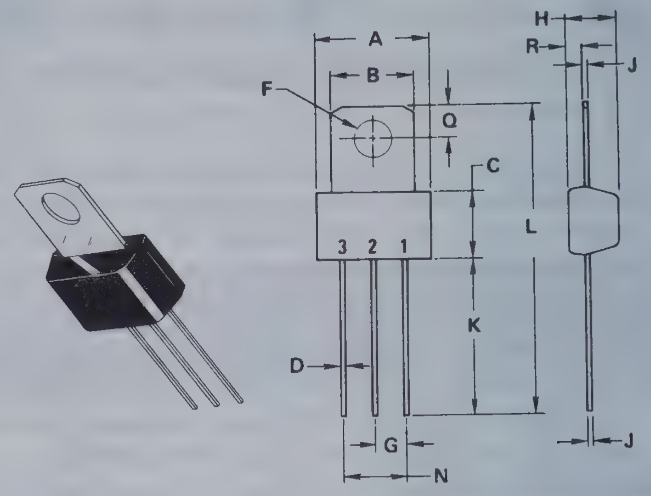
MOTOROLA PLASTIC PACKAGE OUTLINES



CASE 29-02
TO-92

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.450	5.200	0.175	0.205
B	3.180	4.190	0.125	0.165
C	4.320	5.330	0.170	0.210
D	0.407	0.533	0.016	0.021
F	0.407	0.482	0.016	0.019
K	12.700	–	0.500	–
L	1.150	1.390	0.045	0.055
N	–	1.270	–	0.050
P	6.350	–	0.250	–
Q	3.430	–	0.135	–
R	2.410	2.670	0.095	0.105
S	2.030	2.670	0.080	0.105

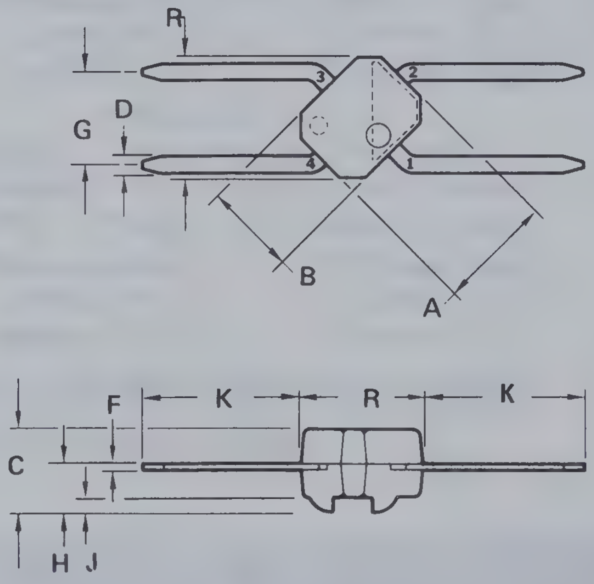
See page 9-39 tab formed for flush mounting

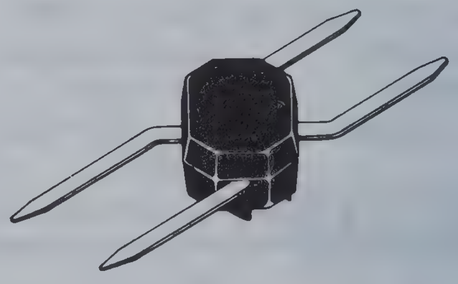


CASE 152-02

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.14	9.53	0.360	0.375
B	6.60	7.24	0.260	0.285
C	5.41	5.66	0.213	0.223
D	0.38	0.53	0.015	0.021
F	3.18	3.33	0.125	0.131
G	2.54 BSC		0.100 BSC	
H	3.94	4.19	0.155	0.165
J	0.36	0.41	0.014	0.016
K	12.07	12.70	0.475	0.500
L	25.02	25.53	0.985	1.005
N	5.08 BSC		0.200 BSC	
Q	2.39	2.69	0.094	0.106
R	1.14	1.40	0.045	0.055

See page 9-39 tab formed for flush mounting





STYLE 2:
PIN 1. COLLECTOR
2. BASE
3. EMITTER
4. BASE

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.95	5.21	0.195	0.205
B	3.94	4.19	0.155	0.165
C	2.67	2.92	0.105	0.115
D	0.64	0.89	0.025	0.035
F	0.20	0.30	0.008	0.012
G	4.06 BSC		0.160 BSC	
H	1.57	1.83	0.062	0.072
J	0.51	0.76	0.020	0.030
K	6.35	7.62	0.250	0.300
R	5.21	5.46	0.205	0.215

CASE 262-02
MICRO-H

MPS-M83
Table 3

PLASTIC ENCAPSULATED SMALL-SIGNAL TRANSISTORS (continued)

DESIGN STOCK

The transistor requirements of most small-signal industrial circuits can be met by a limited number of versatile devices. The ten inexpensive transistors listed below can satisfy most design requirements, while minimizing the number of transistors that must be stocked.

GENERAL-PURPOSE SWITCHES AND AMPLIFIERS

LOW-CURRENT – TO 100 mA

	NPN	PNP
LOW GAIN	2N3903	2N3905
HIGH GAIN	2N3904	2N3906

HIGH CURRENT – TO 500 mA
(these types also have Low Noise at Low Currents)

	NPN	PNP
LOW GAIN	2N4400	2N4402
HIGH GAIN	2N4401	2N4403

HIGH SPEED SATURATED SWITCHES

	NPN		NPN
LOW GAIN	2N4264	HIGH GAIN	2N4265

DEVICE SELECTION TABLES

These short-form specifications of devices are intended for specific applications.

Table 1	General-Purpose Saturated Switching Transistors
Table 2	High-Speed Saturated Switching Transistors
Table 3	General-Purpose Amplifier Transistors
Table 4	Low-Noise Amplifier Transistors
Table 5	High-Voltage Transistors
Table 6	Medium-Power (Uniwatt) Transistors

For complete information, send for appropriate data sheet or refer to the Semiconductor Data Library.

INDEX TO MOTOROLA PLASTIC-ENCAPSULATED SMALL-SIGNAL TRANSISTORS

This index includes all plastic-encapsulated small-signal transistors available from Motorola. For information on devices for which no Table Number is given, contact your nearest Motorola Sales Office.

Device	Table	Device	Table	Device	Table	Device	Table	Device	Table
2N3903	1,3,4	MPS404	1	MPS3711	—	MPS6567	—	MPS-H07	3
2N3904	1,3,4	MPS404A	1	MPS3721	3	MPS6568	—	MPS-H08	3
2N3905	1,3,4	MPS706	2	MPS4354	—	MPS6568A	3	MPS-H10	3
2N3906	1,3,4	MPS706A	2	MPS4355	—	MPS6569	—	MPS-H11	3
2N4123	1,3	MPS708	—	MPS4356	—	MPS6570	—	MPS-H19	3
2N4124	1,3	MPS834	2	MPS5172	3	MPS6571	4	MPS-H20	3
2N4125	1,3	MPS835	2	MPS6507	—	MPS6573	3	MPS-H24	3
2N4126	1,3	MPS918	—	MPS6511	3	MPS6574	3	MPS-H30	3
2N4264	2	MPS2369	2	MPS6512	3	MPS6575	3	MPS-H17	—
2N4265	2	MPS2711	—	MPS6513	3	MPS6576	3	MPS-H31	3
2N4400	1,3	MPS2712	—	MPS6514	3	MPS6590	3	MPS-H32	3
2N4401	1,3	MPS2713	—	MPS6515	3	MPS6591	3	MPS-H34	3
2N4402	1,3	MPS2714	—	MPS6516	3	MPS8000	3	MPS-H37	3
2N4403	1,3	MPS2923	—	MPS6517	3	MPS8001	3	MPS-H54	3
2N4409	5	MPS2924	—	MPS6518	3	MPS8098	3	MPS-H55	3
2N4410	5	MPS2925	—	MPS6519	3	MPS8099	3	MPS-H81	3
2N5086	3,4	MPS2926	—	MPS6520	4	MPS8598	3	MPS-H83	3
2N5087	3,4	MPS3390	—	MPS6521	4	MPS8599	3	MPS-H85	5
2N5088	3,4	MPS3391	—	MPS6522	4	MPS-A05	3	MPS-L01	5
2N5089	3,4	MPS3391A	—	MPS6523	4	MPS-A06	3	MPS-L51	6
2N5208	—	MPS3392	—	MPS6530	3	MPS-A09	3,4	MPS-M83	3
2N5209	3,4	MPS3393	—	MPS6531	3	MPS-A20	3	MPS-U01	6
2N5210	3,4	MPS3394	—	MPS6532	3	MPS-A42	5	MPS-U01A	6
2N5219	—	MPS3395	—	MPS6533	3	MPS-A43	5	MPS-U02	6
2N5220	—	MPS3563	—	MPS6534	3	MPS-A55	3	MPS-U03	6
2N5221	—	MPS3638	1,3	MPS6535	3	MPS-A56	3	MPS-U04	6
2N5222	—	MPS3638A	1,3	MPS6539	—	MPS-D01	3	MPS-U05	6
2N5223	—	MPS3639	2	MPS6540	—	MPS-D02	3	MPS-U06	6
2N5224	—	MPS3640	2	MPS6542	—	MPS-D03	3	MPS-U07	6
2N5225	—	MPS3646	2	MPS6543	—	MPS-D05	3	MPS-U10	6
2N5226	—	MPS3693	3	MPS6544	—	MPS-D51	3	MPS-U31	6
2N5227	—	MPS3694	3	MPS6545	—	MPS-D52	3	MPS-U45	6
2N5228	—	MPS3702	—	MPS6546	—	MPS-D53	3	MPS-U51	6
2N5400	6	MPS3703	—	MPS6547	—	MPS-D55	3	MPS-U51A	6
2N5401	6	MPS3704	—	MPS6548	—	MPS-D56	3	MPS-U52	6
2N5550	6	MPS3705	—	MPS6560	3	MPS-A70	3	MPS-U55	6
2N5551	6	MPS3706	—	MPS6561	3	MPS-A92	5	MPS-U56	6
2N5845	1	MPS3707	—	MPS6562	3	MPS-A93	5	MPS-U57	6
2N5845A	—	MPS3708	—	MPS6563	3	MPS-H02	3	MPS-U60	6
2N6067	—	MPS3709	—	MPS6565	3,4	MPS-H04	3		
MPM5006	3	MPS3710	—	MPS6566	3,4	MPS-H05	3		

TABLE 1
GENERAL-PURPOSE SATURATED SWITCHING TRANSISTORS

The transistors in this table are characterized for general medium-voltage, medium-speed switching applications. These transistors also may be used as general-purpose amplifiers. All have base-emitter voltages of 4 to 6 volts, output capacitances of 4 to 20 pF, and power dissipation ratings of 350 mW. The devices are listed in order of decreasing breakdown voltage (BV_{CEO}), then in order of decreasing collector test current (I_C).

BV_{CEO} Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min	$V_{CE(sat)}$ @ I_C		f_T @ I_C		Switching Times @ I_C/I_B			Device Type	Complement
			Volts Max	mA	MHz Min	mA	ns Max t_{on}	ns Max t_{off}	mA		
NPN											
40	500	25	0.6	500	200	50	40	60	500/50	2N5845**	
40	500	35	0.5	500	250	50	30	50	500/50	2N5845A**	
40	150	100	0.75	500	250	20	35	255	150/15	2N4401	2N4403
40	150	50	0.75	500	200	20	35	255	150/15	2N4400	2N4402
40	10	100	0.3	50	300	10	70	250	10/1.0	2N3904	2N3906
40	10	50	0.3	50	250	10	70	225	10/1.0	2N3903	2N3905
30	2.0	50	0.3	50	250	10	37*	136*	10/1.0	2N4123	2N4125
25	2.0	120	0.3	50	300	10	37*	136*	10/1.0	2N4124	2N4126
PNP											
40	150	100	0.75	500	200	20	35	255	150/15	2N4403	2N3903
40	150	50	0.75	500	150	20	35	255	150/15	2N4402	2N4400
40	100	50	0.3	100	150	50	40	80	500/50	2N6067	
40	10	100	0.4	50	250	10	70	300	10/1.0	2N3906	2N3904
40	10	50	0.4	50	200	10	70	260	10/1.0	2N3905	2N3903
35	12	30	0.2	24	–	–	265	385	10/1.0	MPS404A‡	
30	2.0	50	0.4	50	200	10	43*	155*	10/1.0	2N4125	2N4123
25	50	100	2.0	300	150	50	90	210	300/30	MPS3638A	
25	50	30	1.0	300	100	50	90	210	300/30	MPS3638	
25	2.0	120	0.4	50	250	10	43*	155*	10/1.0	2N4126	2N4124
24	12	30	0.2	24	–	–	265	385	10/1.0	MPS404†	

*Typical †V_{EB} = 12 Vdc ‡V_{EB} = 24 Vdc **P_D = 625 mW @ T_A = 25°C

TABLE 2
HIGH-SPEED SATURATED SWITCHING TRANSISTORS

The transistors listed in this table are optimized for high-speed saturated switching. They are heavily gold doped and otherwise processed to provide very short storage times and low capacitance. (Output capacitances below 6 pF). The power dissipation is rated at 350 mW. The transistors are listed in order of decreasing breakdown voltage (BV_{CEO}), then in order of decreasing collector test current (I_C).

BV_{CEO} Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min	$V_{CE(sat)}$ @ I_C		f_T @ I_C		Switching Times @ I_C/I_B			Device Type
			Volts Max	mA	MHz Min	mA	ns Max t_{on}	ns Max t_{off}	mA	
NPN										
30	10	25	0.25	10	350	10	16	30	10/3.0	**MPS834**
20	10	20	0.3	10	300	10	20	35	10/3.0	**MPS835**
15	30	40	0.35	100	300	10	23	35	100/10	**2N4264**
15	30	30	0.5	300	350	30	25	35	300/30	**MPS3646**
15	10	40	0.25	10	–	–	12	18	10/3.0	**MPS2369**
15	10	20	0.6	10	200	10	40	75	10/–	**MPS706,A**
12	10	100	0.35	100	300	10	23	35	100/10	**2N4265**
PNP										
12	10	30	0.2	10	500	10	40	32	50/5.0	**MPS3640**
6.0	10	30	0.16	10	500	10	40	32	50/5.0	**MPS3639**

PLASTIC ENCAPSULATED SMALL-SIGNAL TRANSISTORS (continued)

TABLE 3
GENERAL-PURPOSE AMPLIFIER TRANSISTORS

These general-purpose transistors are designed for small-signal amplification from dc to low radio frequencies. They are also useful as oscillators and general-purpose switches. The transistors are listed in order of decreasing breakdown voltage (BV_{CEO}), then in order of decreasing collector test current (I_C). $P_D = 350$ mW at $T_A = 25°C$ unless otherwise specified.

BV_{CEO} BV_{CES}* Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min/Max	f_T MHz Min	@ I_C mA	Device Type	Complement
NPN						
200	10	25/—	40	10	MPS-D01	MPS-D51
140	10	25/—	40	10	MPS-D02	MPS-D52
100	10	25/—	40	10	MPS-D03	MPS-D53
80	10	50/—	50	100	MPS-A06*	MPS-A56
80	10	40/—	60	10	MPS6590	
80	1.5	30/150	80	1.5	MPS-H05	MPS-H55
80	1.5	30/120	80	1.5	MPS-H04	MPS-H54
80	1.0	100/300	150	100	MPS8099	MPS8599
60*	50	30/—			MPS8000	
60	10	50/90	50	100	MPS-A05	MPS-A55
60	1.0	100/300	150	100	MPS8098	MPS8598
50	1.0	250/—	30	0.5	2N5210	2N5087
50	1.0	150/—	30	0.5	2N5209	2N5086
50	10	40/—	60	10	MPS6591	
50	0.1	100/600	30	0.5	MPS-A09	
45	20	15/—	500	15	MPS-H34*	
45	10	200/500	200	10	MPS6575	
45	10	100/400	200	10	MPS6566	
45	10	40/160	200	10	MPS6565	
45	7.0	40/—	500	15	MPS-H34	
45	1.0	100/300	200	10	MPS6576	
40	150	100/300	200	20	2N4400	2N4402
40	150	50/150	250	20	2N4401	2N4403
40	100	90/270	390†	50	MPS6531	MPS6534
40	100	40/120	390†	50	MPS6530	MPS6533
40	10	100/300	300	10	2N3904	2N3906
40	10	50/150	250	10	2N3903	2N3905
40	5.0	200/600	100	5.0	MPS-A16	
40	5.0	200/600	80	5.0	MPS-A17	
40	5.0	40/400	125	5.0	MPS-A20	
40	5.0	25/—	300	5.0	MPS-H37	
40	4.0	30/—	400	4.0	MPM5006	
35	10	200/500	200	10	MPS6573	
35	1.0	100/300	200	10	MPS6574	
30	100	30/—	390†	50	MPS6532	MPS6535
30	8.0	30/—	400	8.0	MPS-H24*	
30	4.0	25/—	400	4.0	MPS-H20	
30	4.0	27/200	300	4.0	MPS-H32*	
30	3.0	20/—	400	3.0	MPS-H07*	
30	3.0	20/—	500	3.0	MPS-H08*	
30	2.0	90/180	250†	2.0	MPS6513	MPS6517
30	2.0	50/150	250	10	2N4123	2N4125
30	2.0	50/100	250†	2.0	MPS6512	MPS6516
30	1.0	350/—	50	0.5	2N5088	
25	50	50/—	100	50	MPS-D05	MPS-D55
25	50	50/—	100	10	MPS-D06	MPS-D56
25	10	40/—	100	4.0	MPS8001	
25	10	100/500	120†	2.0	MPS5172	
25	4.0	60/—	650	4.0	MPS-H10	
25	4.0	60/—	650	4.0	MPS-H11	

† typical ‡ h_{fe} @ f = 1.0 kHz * P_D = 625 mW @ T_A = 25°C

PLASTIC ENCAPSULATED SMALL-SIGNAL TRANSISTORS (continued)

TABLE 3 (continued)
GENERAL-PURPOSE AMPLIFIER TRANSISTORS

NPN (continued)

BV_{CEO} Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min/Max	f_T MHz Min	@ I_C mA	Device Type	Complement
25	4.0	45/–	300	4.0	MPS-H19	
25	2.0	250/500	390†	2.0	MPS6515	MPS6519
25	2.0	150/300	390†	2.0	MPS6514	MPS6518
25	2.0	120/360	300	10	2N4124	2N4126
25	1.0	450/–	50	0.5	2N5089	
20	500	50/200	60	10	MPS6560*	MPS6562
20	350	50/200	60	10	MPS6561*	MPS6563
20	4.0	20/200	375	4.0	MPS6568	
20	4.0	20/200	375	4.0	MPS6568A	
20	4.0	20/200	375	4.0	MPS-H02*	
20	4.0	20/200	300	4.0	MPS-H30	
20	4.0	20/200	300	4.0	MPS-H31	
18	2.0	60/660‡			MPS3721	

PNP

BV_{CEO} Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min/Max	f_T MHz Min	@ I_C mA	Device Type	Complement
200	10	25/–	40	10	MPS-D51	MPS-D01
140	10	25/–	40	10	MPS-D52	MPS-D02
100	10	25/–	40	10	MPS-D53	MPS-D03
80	10	50/250	100	50	MPS4356	
80	10	50/–	50	100	MPS-A56*	MPS-A06
80	1.5	30/120	80	1.5	MPS-H54	MPS-H04
80	1.5	30/150	80	1.5	MPS-H55	MPS-H05
80	1.0	100/300	150	100	MPS8599	MPS8099
60	10	100/400	100	50	MPS4355	
60	10	50/500	100	50	MPS4354	
60	10	50/–	50	100	MPS-A55*	MPS-A05
60	1.0	100/300	150	100	MPS8598	MPS8098
50	1.0	250/–	40	0.5	2N5087	2N5210
50	1.0	150/–	40	0.5	2N5086	2N5209
40	150	100/300	200	20	2N4403	2N4401
40	150	50/150	150	20	2N4402	2N4400
40	100	90/270	260†	50	MPS6534	MPS6531
40	100	40/120	250†	50	MPS6533	MPS6530
40	10	100/300	250	10	2N3906	2N3904
40	10	50/150	200	10	2N3905	2N3903
40	5.0	40/400	125	5.0	MPS-A70	
40	2.0	150/300	340†	2.0	MPS6518	MPS6514
40	2.0	90/180	200†	2.0	MPS6517	MPS6513
40	2.0	50/100	200†	2.0	MPS6516	MPS6512
30	100	30/–	260†	50	MPS6535	MPS6532
30	2.5	201/–	350	2.5	MPS-H85	
30	2.5	20/–	600	2.5	MPS-H83*	
30	2.5	20/–	600	2.5	MPS-M83	
30	2.0	50/150	200	10	2N4125	2N4123
25	50	100/–	150	50	MPS3638A	
25	50	50/–	100	10	MPS-D56	MPS-D06
25	50	50/–	100	50	MPS-D55	MPS-D05
25	50	30/–	100	50	MPS3638	
25	2.0	250/500	340†	2.0	MPS6519	MPS6515
25	2.0	120/360	250	10	2N4126	2N4124
20	500	50/200	60	10	MPS6562*	MPS6560
20	350	50/200	60	10	MPS6463*	MPS6561
20		60/–	600	5.0	MPS-H81	

† typical ‡ h_{FE} @ f = 1.0 kHz *P_D = 625 mW @ T_A = 25°C

TABLE 4
LOW-NOISE AMPLIFIER TRANSISTORS

The small-signal transistors listed in this table are characterized for low-noise amplification at low frequencies. The power dissipation is rated at 350 mW. The transistors are listed in order of decreasing breakdown voltage (BV_{CEO}), then in order of decreasing collector test current (I_C).

			Noise Figure @ I_C @		f	f_T @	I_C	
BV_{CEO} Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min/Max	NF dB Max	µA	Hz	MHz Min	mA	Device Type
NPN								
50	0.1	200/600	3.0	20	1.0 kHz	30	0.5	2N5210
50	0.1	100/300	4.0	20	1.0 kHz	30	0.5	2N5209
50	0.1	100/600	1.4*	100	1.0 kHz	30	0.5	MPS-A09
45	1.0	800/–	1.5	100	10 Hz-15.7 kHz	100	1.0	MPS-A18
45	10	100/400	4.0*	100	10 Hz-15.7 kHz	100	10	MPS6566
45	10	40/160	4.0*	100	10 Hz-15.7 kHz	40	10	MPS6565
40	0.1	40/–	5.0	100	10 Hz-15.7 kHz	300	10	2N3904
40	0.1	20/–	6.0	100	10 Hz-15.7 kHz	300	10	2N3903
30	0.1	300/900	3.0	100	10 Hz-15.7 kHz	50	0.5	2N5088
25	0.1	400/1200	2.0	100	10 Hz-15.7 kHz	50	0.5	2N5089
25	0.1	150/–	3.0	10	10 Hz-10 kHz	480*	10	MPS6521
25	0.1	100/–	3.0	10	10 Hz-10 kHz	480*	10	MPS6520
20	0.1	250/1000	1.2*	100	100 Hz	50	0.5	MPS6571
15	5.0	25/250	6.0	500	200 MHz	800	5.0	MPS-A17
PNP								
50	0.1	250/800	2.0	20	10 Hz-15.7 kHz	40	0.5	2N5087
50	0.1	150/500	3.0	20	10 Hz-15.7 kHz	40	0.5	2N5086
40	0.1	60/–	4.0	100	10-Hz-15.7 kHz	250	10	2N3906
40	0.1	30/–	5.0	100	10 Hz-15.7 kHz	200	10	2N3905
25	0.1	150/–	3.0	10	10 Hz-15.7 kHz	420*	10	MPS6523
25	0.1	100/–	3.0	10	10 Hz-15.7 kHz	420*	10	MPS6522

*Typical

PLASTIC ENCAPSULATED SMALL-SIGNAL TRANSISTORS (continued)

TABLE 5
HIGH-VOLTAGE TRANSISTORS

These high-voltage transistors are designed for driving neon bulbs and Nixie® indicator tubes, for direct line operation, and for other applications requiring high-voltage capability at relatively low collector current. See Table 6 Medium-Power (Uniwatt) Transistors also. Power Dissipation is rated at 350 mW. These devices are listed in order of decreasing breakdown voltage (BV_{CEO}), then in order of decreasing collector test current (I_C).

BV_{CEO} Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min/Max	$V_{CE(sat)}$ @	I_C	f_T @	I_C	Device Type
			Volts Max	mA	MHz Min/Max	mA	
NPN							
300	10	40/–	0.5	20	50/–	10	MPS-A42
200	10	40/–	0.4	20	50/–	10	MPS-A43
160	10	80/250	0.15	10	100/300	10	2N5551
140	10	60/250	0.15	10	100/300	10	2N5550
120	10	50/300	0.2	10	60/–	10	MPS-L01
80	1.0	60/400	0.2	1.0	60/300	10	2N4410
50	1.0	60/400	0.2	1.0	60/300	10	2N4409
PNP							
300	10	40/–	0.5	20	50/–	10	MPS-A92
200	10	40/–	0.4	20	50/–	10	MPS-A93
150	10	60/240	0.2	10	150/300	10	2N5401
120	10	40/180	0.2	10	100/400	10	2N5400
100	50	40/250	0.25	10	60/–	10	MPS-L51

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TABLE 6
MEDIUM-POWER (UNIWATT) TRANSISTORS

For applications requiring higher power dissipation than that of the standard Unibloc package, Motorola has developed the Uniwatt case. In this plastic-encapsulated package, which is slightly larger than the small-signal case, the chip is mounted on a metal tab that extends out of the plastic. The tab can be attached to a heat sink to conduct heat away from the junction. With a satisfactory heat sink, Uniwatt transistors can dissipate up to 10 watts with the case temperature at 25°C. Without a heat sink, power dissipation at an ambient temperature of 25°C is 1 watt. The transistors are listed in order of decreasing breakdown voltage (BV_{CEO}).

BV_{CEO} BV_{CES}* Volts	Collector Test Current for h_{FE} I_C in mA	h_{FE} Min/Max	$V_{CE(sat)}$ @	I_C	f_T @	I_C	P_D Watts $T_C = 25°C$	Device Type	Complement	Comments
			Volts Max	mA	MHz Min	mA				
NPN										
300	10	40/ –	0.75	30	60	10	1.0*	MPS-U10	MPS-U60	High-Voltage Amplifier
180	10	40/ –	0.5	200	100	50	5.0	MPS-U04		High-Voltage Amplifier
120	10	40/ –	0.5	200	100	50	5.0	MPS-U03		High-Voltage Amplifier
100	250	30/ –	0.4	250	50	200	10	MPS-U07	MPS-U57	High-Voltage Amplifier
80	250	100/ –	0.6	250	50	250	5.0	MPS-U06	MPS-U56	General Purpose
65*	100	10/–	–	–	–	–	10	MPS-U31		RF Power Output
60	250	100/ –	0.6	250	50	250	5.0	MPS-U05	MPS-U55	General Purpose
40	200	25k/150k	1.5	1000	1000	200	10	MPS-U45	MPS-U95	Darlington
40	150	50/300	0.4	150	150	20	6.0	MPS-U02	MPS-U52	General Purpose
40	100	60/ –	0.5	1000	50	50	8.0	MPS-U01A	MPS-U51A	Audio Transistor
30	100	60/ –	0.5	1000	50	50	8.0	MPS-U01	MPS-U51	Audio Transistor
PNP										
300	10	30/–	0.75	20	60	10	10	MPS-U60	MPS-U10	High-Voltage Amplifier
100	250	30/ –	0.5	250	50	200	10	MPS-U57	MPS-U07	High-Voltage Amplifier
80	250	50/130	0.5	250	50	250	1.0	MPS-U56	MPS-U06	General Purpose
60	250	50/130	0.5	250	50	250	1.0	MPS-U55	MPS-U05	General Purpose
40	200	25k/150k	1.5	1000	50	200	10	MPS-U95	MPS-U45	Darlington
40	150	50/300	0.4	150	150	20	6.0	MPS-U52	MPS-U02	General Purpose
40	100	60/ –	0.7	1000	50	50	8.0	MPS-U51A	MPS-U01A	Audio Transistor
30	100	60/ –	0.7	1000	50	50	8.0	MPS-U51	MPS-U01	Audio Transistor

SMALL-SIGNAL HERMETIC TRANSISTORS

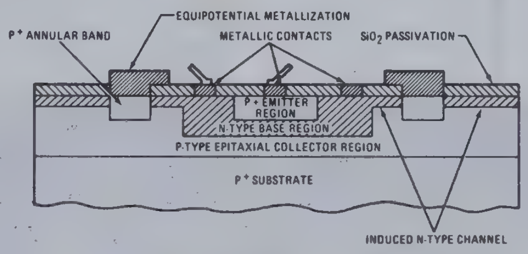
This Selector Guide covers Motorola's broad line of silicon annular and germanium mesa hermetic transistors. It includes over 400 proven transistors suitable for all low-level switching and amplifying applications: NPN and PNP polarities, breakdown voltages to 300 V, output capacitances less than 3.0 pF, and maximum collector current ratings to 3.0 amperes. For maximum convenience, transistors are available in all metal cases. Many of the transistors are high-reliability JAN/JANTX/JANTXV packages.

SILICON ANNULAR TRANSISTORS

Motorola small-signal silicon transistors have demonstrated exceptional long-term stability and reliability in the life test laboratory and in thousands of applications. Their reliability is well demonstrated by the extensive listings of JAN and JAN TX parts in this guide.

The variety, excellent characteristics and stability of Motorola transistors are made possible by such developments as Motorola's Annular process, which produces an annular band around the active geometry of transistors to eliminate channeling in the bulk material of the semiconductor material. This results in very low leakage and high reliability. Motorola's Field Relief Electrode (Equipotential Ring), stabilizes the surface of the transistor, and Motorola's Epitaxial Structure permits ultra-high speed devices and low collector resistance. In addition, the geometries of Motorola transistors are designed to provide optimum characteristics for the use intended.

CROSS SECTION OF AN ANNULAR PNP TRANSISTOR STRUCTURE



Germanium mesa small-signal transistors are a step forward in reliability. Bonding the transistor die directly to the header provides unparalleled mechanical strength not available in alloy or grown junction type devices. Improved stability and lower leakage currents are also important advantages of this method of fabricating germanium RF amplifier and switching transistors.

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SMALL-SIGNAL HERMETIC TRANSISTORS (continued)

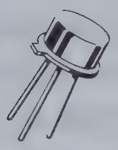

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TABLE 1 – SILICON AMPLIFIER TRANSISTORS (600 mW to 1.0 W)

$h_{FE(min)}$		LOW CURRENT Normal Operation – µA Range			MEDIUM CURRENT Normal Operation – Low mA Range			HIGH CURRENT Normal Operation – Mid mA Range				
		BV_{CEO}			BV_{CEO}			BV_{CEO}				
		300 V	200 V	100 V	80 V	50 V	20 V	250 V	200 V	150 V	100 V	60 V
≈ 100	NPN			**2N3712**	2N3019 • **MM3019**	2N1711 **2N2219A**** 2N2192,A,B	2N1420 2N1890 **2N2219**** 2N2959 2N3300					
	PNP				• **2N4405** MM4010	**2N2905A**** MM4009	**2N2905**** MM4008			**2N3637****	**2N3635****	
≈ 50	NPN	**2N3742**	MM3002 MM3003	• MM3008 • **MM3009**	2N2297 2N3020 2N3036 • **MM3020**	2N657 2N699 2N1613* 2N2102 2N2193,A,B **2N2218A**** 2N2224 2N3053 • **MM3053**	2N697 **2N2218**** 2N2270 2N2789 2N2958 2N3110 2N3299			2N4925 MM2258 MM2260	2N4924 • **MM3007**	• **MM3005** • **MM3006**
	PNP	• 2N3743**	• **2N4930**** • 2N4931** • MM4003	• MM4002	2N3495 • **2N4404**	**2N2904A**** 2N3494 • MM4036	2N1132* **2N1132A** 2N2303 2N2801 **2N2904**** 2N3133 2N3671 • **2N4890** • MM4037			**2N3636****	**2N3634**** • MM4007 • MM4031 • **MM5007**	• 2N4407 • **2N5864** • MM4006 • MM4030 • MM4033 • **MM5005** • **MM5006**
≈ 20	NPN					2N1990 **2N2194,A,B** 2N2941	2N696 2N2194,A,B **2N2195,A,B** 2N2217 **2N2788** 2N3295	2N4926	2N4927	**2N3114** MM2259 MM3000 MM3001		2N657 2N1990 2N2405 • **MM1893**
	PNP				**2N4928** MM4000	2N3072 **2N3081**	2N1131* **2N1131A** 2N1991 2N2800 2N2927 2N3120				• **2N4929**** MM4001	• 2N4406 **2N5865** • MM4005 • MM4032

*Motorola approved to supply JAN product
**Motorola approved to supply JAN & JANTX product
Bold Face indicates Motorola preferred types – chosen using performance and cost as criteria.

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TABLE 2 – SILICON AMPLIFIER TRANSISTORS (360 mW to 600 mW)

		LOW CURRENT NORMAL OPERATION – µA RANGE			MEDIUM CURRENT NORMAL OPERATION – LOW mA RANGE			HIGH CURRENT NORMAL OPERATION – MID mA RANGE		
		BV_{CEO}			BV_{CEO}			BV_{CEO}		
$h_{FE(min)}$		90 V	60 V	45 V	60 V	40 V	25 V	80 V	60 V	45 V
≈ 100	NPN		**2N2484 L.N.** MM2484 L.N.	2N930** L.N. **2N930A L.N.**		2N843 2N956 **2N2222A** ** 2N3303 **2N3947** □ 2N5582** ★ MM3904	**2N2222** ** 2N2792 2N3116			
	PNP	2N3798A L.N. **2N3799A L.N.**	2N3798 L.N. **2N3799 L.N.**	2N4359	**2N2907A** ** **2N3251A** ** □ 2N3486A** □ 2N3672	**2N2907** ** 2N3136 **2N3251** ** □ 2N3486 ★ MM3906				
≈ 50	NPN		2N2483	2N929** **2N929A**		2N915 **2N2221A** ** **2N3946** □ 2N5581** ★ MM3903	2N718 2N916* **2N2221** ** 2N2791 2N3115 2N3298 2N3301	**2N720A** 2N740 2N2896	**2N718A** ** 2N736 2N910 2N2895	2N841 2N2897
	PNP				**2N2906A** ** **2N3250A** ** □ 2N3485A** 2N3496 2N3497 □ 2N3673	2N2838 **2N2906** ** 2N3135 **2N3250** ** □ 2N3485 ★ MM3905	2N727 2N995 □ 2N2695			
≈ 25	NPN			■ **2N918** ** ■ 2N917 ■ 2N2708JAN		2N2331 2N2952	2N717 2N2220 2N2790 2N3544 MM1941	2N739		
	PNP			■ 2N3307 ■ **2N3308**	**2N3073** 2N3121	2N722 2N2837	2N726 **2N869** 2N978			

*Motorola Approved to Supply JAN Product

**Motorola Approved to Supply JAN & JAN TX Product

Bold Face Indicates Motorola Preferred Types – Chosen using Performance and Cost as Criteria

L.N. Recommended for Low Noise Applications

SMALL-SIGNAL HERMETIC TRANSISTORS (continued)

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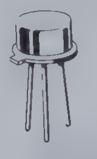
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TABLE 3 – SILICON SWITCHING TRANSISTORS

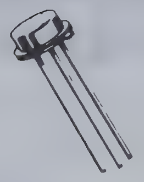
$t_{on} + t_{off}$		LOW CURRENT Specified Switching I_C 5 mA – 100 mA					MEDIUM CURRENT Specified Switching I_C 100 mA – 500 mA			HIGH CURRENT Specified Switching I_C 400 mA – 1.5 A		
		BV_{CEO}					BV_{CEO}			BV_{CEO}		
		6.0 V	12 V	20 V	15 V	10 V	50 V	40 V	30 V	50 V	40 V	30 V
< 50 ns	NPN			2N702 2N703* 2N834 □ 2N2206 □ 2N2319 **2N2501** 2N2710 **2N3227** □ 2N3508 □ 2N3509	**2N708**** 2N2368 2N2369 **2N2369A**** 2N3211 ★ 2N3511 □ 2N3648	2N744 2N2256 2N2257 2N3010 2N3011 ★ 2N3510 □ **2N3647** ★ MM1748 ★ MM1748A	● 2N3725		**2N914**** ★ 2N3009 ★ 2N3013* ★ 2N3014 ● 2N3724	● MM3737		○ **2N3303** ● MM3736
	PNP	2N4257	2N4258		MM4208A **MM4209A** Non Saturated Applications ■ 2N4260 ■ **2N4261** ■ MM4261H	MM4208 **MM4209**						
< 150 ns	NPN			2N753 2N835	**2N706*** 2N706A 2N706B 2N2242 **2N2481**** □ MM1744B	**2N709**		● **2N5859**	○ 2N2476 ○ 2N2537 ○ **2N2538** 2N2539 **2N2540** 2N2845 **2N2847** 2N3210 ○ 2N3512	○ 2N3444* ○ **2N3507**** ● 2N3735 □ 2N3737 ● **2N5861**	○ 2N3253* ○ **2N3506****	○ **2N3252** ● 2N3734 □ 2N3736
	PNP			**MM869B**	**2N869A****	2N2894 2N3304 2N3546 **MM2894A**	○ 2N2904A** ○ 2N2905A** 2N2906A** **2N2907A**** □ 2N3485A** □ 2N3486A**	○ 2N2904** ○ 2N2905** 2N2906** **2N2907**** □ 2N3485 □ 2N3486	2N3248 **2N3249**	○ 2N3468* ○ **2N3763**** ○ 2N3765** ○ MM3726	○ **2N3467*** ○ 2N3762 ○ 2N3764	
< 350 ns	NPN			★ MM3903 ★ MM3904				○ 2N2218A** ○ 2N2219A** 2N2221A** **2N2222A**** □ 2N5581** □ 2N5582**	○ 2N3299 ○ **2N3300** 2N3301 **2N3302**			
	PNP			○ 2N2800 ○ 2N2801 **2N3250,A**** **2N3251,A**** ★ MM3905 ★ MM3906				● **2N4890**	○ 2N3133 ○ **2N3134** 2N3135 **2N3136**	○ 2N3245 ● 2N4404 ● **2N4405** ● 2N4406 ● **2N4407**	○ **2N3244**	
< 1.0 s	NPN						(100 V) ○ 2N3498** ○ 2N3499** (150 V) ○ 2N3500** ○ **2N3501****		○ 2N2958 ○ **2N2959** 2N3115 **2N3116**			
	PNP			(80 V) ○ 2N3494 (120 V) ○ **2N3495** (80 V) 2N3496 (120 V) **2N3497** (140 V) ○ 2N3634** (175 V) ○ 2N3635** (140 V) ○ 2N3636** (175 V) ○ **2N3637****			● MM4036	● MM4037		□ MM4026 □ MM4027 □ MM4028 □ **MM4029** ● MM4030 ● MM4031 ● MM4032 ● **MM4033**		

*Motorola approved to supply JAN product
**Motorola approved to supply JAN & JANTX Product
Bold Face indicates Motorola preferred types – chosen using performance and cost as the criteria.

SMALL-SIGNAL HERMETIC TRANSISTORS (continued)

TO-5
Case 31 (1)

TO-18
Case 22 (1)



TO-46
Case 26

TABLE 4 – CHOPPER TRANSISTORS

Transistors designed for chopper applications have low offset currents, low "on" voltage, high "off" resistance, and fast switching times. These devices are listed first in decreasing order of breakdown voltage (BV_{CEO}), then in order of decreasing maximum collector current (I_C max) and dc current gain (h_{FE}).

BV_{ECO} Volts Min	I_C mA Max	h_{FE} Min	BV_{EBO} Volts Min	h_{FE} (Inv)	$V_{EC(off)}$ mVdc Max	f_T MHz Typ	$r_{ec(on)}$ Ohms Max	Package	Device Type
NPN									
20	500	50	7.0	–	3.0	250	–	TO-5	2N2330
20	500	50	7.0	–	3.0	250	–	TO-18	2N2331
PNP									
35	100	30	40	3.0	0.8	14	45	TO-46	2N2946
30	500	20	30	3.0	2.0	12*	2.0	TO-46	MM4052
30	100	50	50	15	0.8	14	10	TO-46	2N5231
20	100	50	30	15	0.5	14	8.0	TO-46	2N5230
20	100	40	25	4.0	0.5	14	35	TO-46	2N2945
10	100	80	15	6.0	0.3	16	20	TO-46	2N2944
10	100	50	15	15	0.5	14	6.0	TO-46	2N5229

*Min

TABLE 5 – LOW-NOISE AMPLIFIER TRANSISTORS

These transistors are characterized for low-noise amplification at low frequencies. The transistors are listed first in order of decreasing breakdown voltage (BV_{CEO}), then in order of decreasing maximum collector current (I_C max) and dc current gain (h_{FE}).

BV_{CEO} Volts Min	I_C mA Max	h_{FE} Min/Max	@ I_C mA	C_{ob} pF Max	NF dB Max	f_T MHz Typ	Package	Device Type
NPN								
60	50	100/500	0.01	6.0	3.0	70	TO-18	MM2484
45	30	100/300	0.01	6.0	3.0	70	TO-18	2N930A
PNP								
90	50	300/900	0.5	4.0	2.5	100	TO-18	2N3799A
90	50	150/450	0.5	4.0	3.5	100	TO-18	2N3798A
60	50	300/900	0.5	4.0	2.5	100	TO-18	2N3799
60	50	150/450	0.5	4.0	3.5	100	TO-18	2N3798

TABLE 6 – AVALANCHE TRANSISTOR

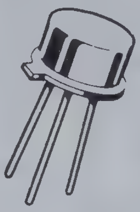
Transistor designed for AVALANCHE mode operation for the generation of high-current pulses with nanosecond rise times. Ideal for applications such as laser diodes, high-current pulse generators, vacuum tube driver and other applications requiring ultra high-speed, high-voltage or high-current pulses.

CASE 79 (1)
TO-39

BV_{CER} Volts Min	I_C Amps Max	V_o Volts Min	t_d ns Max	t_r ns Max	Package	Device Type
NPN						
200	5.0	100	5.0	1.0	TO-39	2N5271

TABLE 7 – MEMORY DRIVER TRANSISTORS

These transistors are designed for medium-current, high-speed switching applications. Ideally suited for ferrite core memory driver circuits.



CASE 22
TO-18

BV_{CEO} Volts @ I_C		BV_{CBO} Volts @ I_C		h_{FE} @ I_C & V_{CE}			$V_{CE(sat)}$ Volts @ I_C & I_B			f_T @ I_C & f			t_{on} @ I_C Typ		t_{off} @ I_C Typ		Device Type
Min	mA	Min	µA	Min	mA	Volts	Max	mA	mA	MHz Min	mA	MHz	ns	mA	ns	mA	
NPN																	
50	10	80	10	35	500	1.0	0.52	500	50	300	50	100	35	500	60	500	2N3725
50	10	80	10	35	500	1.0	0.52	500	50	300	50	100	20	500	50	500	2N4014
50	10	100	100	25	500	1.0	0.5	500	50	200	50	100	25	500	60	500	2N5861
40	10	80	100	30	500	1.0	0.4	500	50	250	50	100	35	1000	60	1000	2N5859
30	10	50	10	35	500	1.0	0.42	500	50	300	50	100	35	500	60	500	2N3724
30	10	50	10	35	500	1.0	0.42	500	50	300	50	100	20	500	50	500	2N4013
12	30	25	500	30	300	0.5	0.3	300	30	450	100	100	15	1000	25	1000	2N3303
PNP																	
60	10	60	10	35	500	1.0	0.5	500	50	150	50	100	42	1000	115	1000	2N3763
60	10	60	10	35	500	1.0	0.5	500	50	150	50	100	42	1000	115	1000	2N3765
40	10	40	10	35	500	1.0	0.5	500	50	180	50	100	42	1000	115	1000	2N3762
40	10	40	10	35	500	1.0	0.5	500	50	180	50	100	42	1000	115	1000	2N3764

SMALL-SIGNAL HERMETIC TRANSISTORS (continued)

TABLE 8– GERMANIUM MESA RF AMPLIFIERS

NOISE FIGURE (typ)	f_T	LOW CURRENT 1 mA - 50 mA BV_{CEO} 35 V	 25 V	 15 V	MEDIUM CURRENT 25 mA - 100 mA BV_{CEO} 35 V	 25 V	 15 V
< 3.0 dB	< 600 MHz						Usable to 500 mA △ 2N1561 △ **2N1562** ▲ 2N1692 ▲ **2N1693**
	> 600 MHz		■ 2N2415 ■ **2N2416** ■ 2N3279 ■ 2N3280 ■ 2N3281 ■ **2N3282** ■ 2N3783 ■ 2N3784 ■ **2N3785**			■ **2N2996** ■ 2N2997 ■ 2N2998	
< 6.0 dB	< 600 MHz				□ **2N499*** □ 2N499A* **2N502** 2N502A,B*		
	> 600 MHz		■ 2N3127* ■ 2N3283 ■ 2N3284 ■ 2N3285 ■ **2N3286**				**2N1141,A** 2N1142* 2N1142A 2N1143,A 2N1195* ● 2N1742
> 6.0 dB	< 600 MHz					■ 2N705* ■ **2N2273*** ■ 2N3323 ■ 2N3324 ■ 2N3325 MM2273	

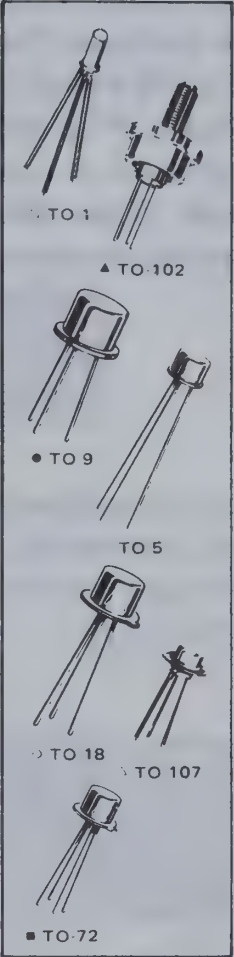
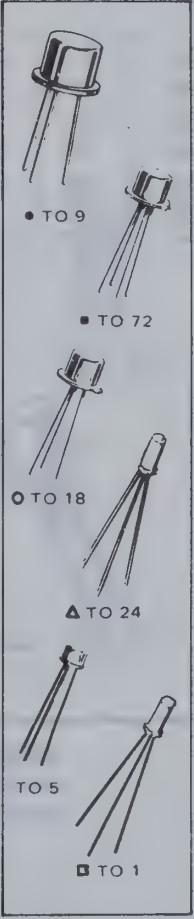


TABLE 9 – GERMANIUM MESA PNP SWITCHES

$t_{s(typ)}$	$I_{C(max)}$ to 55 mA BV_{CEO} to 6.0 V	$I_{C(max)}$ to 150 mA BV_{CEO} to 20 V	 8.0 V	$I_{C(max)}$ to 175 mA BV_{CEO} to 30 V	$I_{C(max)}$ to 550 mA BV_{CEO} to 35 V
< 20 ns			□ **2N501** □ 2N501A* ○ 2N711A,B ○ 2N741,A ○ 2N779,A ○ 2N828,A ○ 2N829 ○ 2N837 ○ 2N838 ○ 2N960 ○ 2N961 ○ **2N962*** ○ 2N963 ○ 2N964* ○ 2N964A ○ 2N965 ○ 2N966 ○ **2N967** ○ 2N985		MA4404† MA4404A† MM4404† MM4404A†
< 50 ns				○ **2N705*** ○ 2N710 ○ 2N711 ○ 2N827 ○ 2N968 ○ 2N969 ○ **2N970** ○ 2N971 ○ 2N972 ○ 2N973 ○ 2N974 ○ 2N975 ○ **2N2258** ○ 2N2259 ○ **2N2635** ○ **2N2955** ○ 2N2956 ○ 2N2957	**2N1204,A** 2N1494,A 2N1495 2N1496 **2N2096** 2N2097 2N2099 2N2100 **2N2381** 2N2382 2N3883
< 90 ns	○ 2N559*	● **2N1499,A,B** ● 2N1500 ● 2N1754 ● 2N2048			
< 200ns		△ **2N393***			



**Motorola approved to supply JAN product

Bold Face Motorola preferred types — chosen using performance and cost as criteria

+BV_{CES}

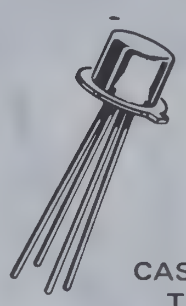
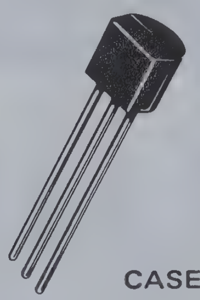
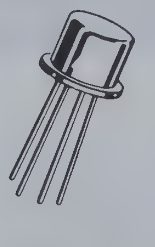
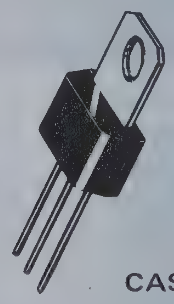
DARLINGTON and MULTIPLE TRANSISTORS

Motorola offers a complete selection of high performance discrete transistors in many different multiple packages. The TO-5, six pin metal package (Case 654-07) and the ceramic flat pack (Case 610A-03) allow two transistors with closely matched parameters to track those parameters over temperature. The ceramic flatpack quad (Case 607-04) allows space saving designs where closely spaced printed circuit cards are mandatory. The Dual-In-Line packages – ceramic (Case 632-02) and plastic (Case 646) allow automatic insertion and considerable costs savings in incoming QC 100% testing, warehouse, etc. Specials allow a different chip in each available position.

TABLE 1 – DARLINGTON AMPLIFIER TRANSISTORS

Darlington amplifiers are cascade transistors used in applications requiring very high current gain and input impedance. The plastic transistors have monolithic construction and the metal packaged transistors are two chip construction. The transistors are listed in order of decreasing breakdown voltage (BV_{CEO}).

BV_{CES}* $BV_{CEO(sus)}$# BV_{CEO} Volts Min	I_C mA	BV_{CBO} Volts Min	I_C µA	h_{FE} @ I_C & V_{CE} Min	mA	Volts	$V_{CE(sat)}$ Volts @ I_C & I_B Max	mA	mA	$V_{BE(on)}$ Volts @ I_C & V_{CE} Max	mA	Volts	f_T @ I_C & f MHz Min	mA	MHz	NF dB Typ	Device Type
NPN																	
60#	30	100	100	8,000	10	5.0	–	–	–	–	–	–	1.0	1.0	0.001	6.0	2N998
60	10	80	10	10,000	10	5.0	1.0	10	1.0	–	–	–	100	10	20	10	2N2723
40	20	60	100	12,000	10	5.0	1.0	15	3.0	–	–	–	10	1.0	10	–	2N2785
40	0.1	50	100	25,000	200	5.0	1.5	100	2.0	2.0	1000	5.0	100	200	100	–	MPS-U45
30	0.1	–	–	10,000	10	5.0	1.5	100	0.1	1.25	100	5.0	125	10	100	2.0	MPS-A14
30	0.1	–	–	5,000	10	5.0	1.5	100	0.1	1.25	100	5.0	125	10	100	2.0	MPS-A13
25	0.1	–	–	1,000	10	5.0	1.0	100	0.1	–	–	–	100	10	100	–	MPS-D04
20	0.1	–	–	20,000	10	5.0	1.0	100	0.01	1.4	10	5.0	0.035	10	0.001	–	MPS-A12
PNP																	
40	0.1	50	100	25,000	200	5.0	1.5	1000	2.0	2.0	1000	5.0	50	200	100	–	MPS-U95
30	0.1	–	–	75,000	10	5.0	1.5	100	0.1	2.0	100	5.0	100	10	100	2.0	MPS-A66
30	0.1	–	–	50,000	10	5.0	1.5	100	0.1	2.0	100	5.0	100	10	100	2.0	MPS-A65
30	10	40	10	30,000	10	5.0	2.0	500	1.0	–	–	–	175	10	100	6.0	2N4974
30	10	40	10	15,000	10	5.0	2.0	500	1.0	–	–	–	175	10	100	6.0	2N4975
25	0.1	–	–	1,000	10	5.0	1.0	100	0.1	–	–	–	100	10	100	–	MPS-D54

 CASE 29-02 TO-92	 CASE 20 TO-72	 CASE 34A TO-12	 CASE 152-02
2N998 2N2723 2N2785	MPS-A12 MPS-A13 MPS-A14 MPS-A65 MPS-A66 MPS-D04 MPS-D54	2N4947 2N4975	MPS-U45 MPS-U95

DARLINGTON and MULTIPLE TRANSISTORS (continued)

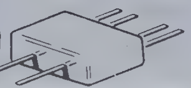
TABLE 2 – DUAL TRANSISTORS

The dual transistor allows close temperature tracking of matched parameters. The die are from adjacent locations on the wafer. Two package types are available. JAN,JANTX and JANTXV qualified devices are available in the metal package (Case 654-07).

Devices Listed in Decending Order of Magnitude of h_{FE}
Dual In-House Numbers (MD) are Electrically Equivalent to the EIA Registered Counterpart

h_{FE_1}/h_{FE_2}	Low Noise-High Gain Amplifiers		General Purpose Amplifiers & Switches			Core Driver App	High Speed Switches and High Frequency Oscillators	
	BV_{CEO}		BV_{CEO}			BV_{CEO}	BV_{CEO}	
	60 V	40 V	60 V	40 V	30 V	40 V	15 V	12 V
0.9/1.0 10% NPN	**2N2920**** 2N2453A **2N2919****	**2N2642**** 2N2722 **2N2916** 2N2975 ■ 2N3043 **2N2915** 2N2974 **2N2639**** ■ 2N3046 MD7002B MD7091	2N2652A **2N2060**** 2N2060A 2N2223A 2N2720		**2N2903A** MD1129 ■ MD1129F MD3410 MD3411 MD1121 MD1122		**MD918A** ■ MD918AF MD1132 **MD708A** ■ MD708AF **MD2369A** ■ MD2369AF	
PNP	■ 2N3817 **2N3811**** ■ 2N3816 **2N3810**** "A" version of above have 5% h_{FE} match	MD7003B	2N4015 2N4016	2N3726 **MD3251A** ■ MD3251AF MD1130 ■ MD1130F 2N4937 ■ 2N4940 **MD3250A** ■ MD3250AF			MD5000A	
0.8/1.0 20% NPN		2N2643 **2N2918** ■ 2N3044 **2N2917** 2N2640 ■ 2N3047 MD7002A MD7092	**2N2652** 2N2223 2N2721	**2N2480A** 2N2480	**2N2903** MD1120 MD3409		**MD918B** ■ MD918BF **MD708B** ■ MD708BF	
PNP	■ 2N3815 **2N3809** ■ 2N3814 **2N3808**	MD7003A		**2N4938** ■ 2N4941 MD1123			MD5000B	
> 0.8/1.0 20% or Unmatched NPN		2N2644 **2N2914** ■ 2N3045 2N2453 **2N2913** 2N2641 ■ 2N3048 MD7002		**2N5794** MD2219A ■ MD2219AF **2N5793**	**MD2219** ■ MD2219F MD7000 **MD2218**	**MD3725** ■ MD3725F	**MD918** ■ MD918F **MD708** ■ MD708F **MD2369** ■ MD2369F 2N3425	**MD7005** MD7004
PNP	■ 2N3813 **2N3807** ■ 2N3812 **2N3806**	**MD7003** MD7006	**2N5796** MD2905A ■ MD2905AF **2N5795** MD2904A ■ MD2904AF	2N3727 **MD3251** ■ MD3251F 2N4939 ■ 2N4942 MD2904 ■ MD2904F MD3250 ■ MD3250F MD7007 MD7007A	**MD7001** MD984	**MD3467** ■ MD3467F **MD3762** ■ MD3762F	MD5000	
Complementary Pairs 1-NPN/1-PNP		**MD6100**		■ 2N3838** **2N4854**** 2N4885	MD985 ■ MD985 **MD6002** ■ MD6002F MD6003 ■ MD6003F MD7011 **MD6001** ■ MD6001F		MD986 ■ MD986F	

**Motorola approved to supply JAN & JANTX product
Bold Face Motorola preferred types — chosen using performance and cost as criteria.

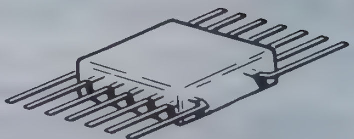
■ 

610A-03
(Ceramic)

654-07

TABLE 3 – QUAD TRANSISTORS (Flat Pack)

Each quad transistor contains four similar transistors.
This package can be used to reduce space requirements.



607-04
(Ceramic)

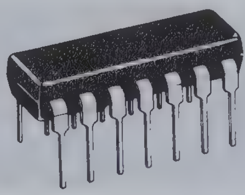
Device Type	BV_{CEO} Volts Min	I_C mA	BV_{CBO} Volts Min	I_C µA	h_{FE} — Min	@ I_C mA	& V_{CE} Volts	$V_{CE(sat)}$ Volts Max	@ I_C mA	& I_B mA	f_T MHz Min	@ I_C mA	& f MHz	t_{on} Typ ns	@ I_C mA	t_{off} Typ ns	@ I_C mA
NPN-GENERAL PURPOSE																	
MQ930	45	10	60	10	150	1.0	5.0	35	1.0	0.1	–	–	–	–	–	–	–
MQ1120	30	10	60	10	40	1.0	10	100	10	1.0	200	20	100	–	–	–	–
MQ1129	30	10	60	10	100	1.0	10	0.15	10	1.0	200	20	100	–	–	–	–
MQ2218	30	10	60	10	35	10	10	0.4	150	0.5	200	20	100	60	150	350	150
MQ2218A	40	10	75	10	20	11	10	0.3	150	15	200	20	100	45	0.5	310	150
MQ2219	30	10	60	10	75	10	10	0.4	150	15	200	20	100	60	150	350	150
MQ2219A	40	10	75	10	75	10	10	0.3	150	15	250	20	100	45	150	310	150
MQ2369	15	10	40	10	40	10	1.0	0.25	10	1.0	500	10	100	15	10	20	10
MQ2484	60	10	60	10	200	0.5	5.0	0.35	1.0	0.1	–	–	–	–	–	–	–
PNP GENERAL PURPOSE																	
MQ2904	40	10	60	10	35	10	10	0.4	150	15	200	50	100	42	150	130	150
MQ2905A	60	10	60	10	100	10	10	0.4	150	15	200	50	100	42	150	130	150
MQ3251	40	10	50	10	100	10	5.0	0.25	10	1.0	300	10	100	–	–	–	–
MQ3798	60	10	60	10	150	1.0	5.0	0.2	0.1	0.01	–	–	–	–	–	–	–
MQ3799	60	10	60	10	300	1.0	5.0	0.2	0.1	0.01	–	–	–	–	–	–	–
MQ3799A	60	10	60	10	300	1.0	5.0	0.2	0.1	0.01	–	–	–	–	–	–	–
NPN CORE DRIVER																	
MQ3725	40	10	65	10	50	100	1.0	0.26	100	10	–	–	–	45	500	75	500
PNP CORE DRIVER																	
MQ3467	40	10	40	10	20	500	1.0	0.5	500	50	150	50	100	40	500	110	500
2N5146	40	10	40	10	20	1000	2.0	1.0	1000	100	150	50	100	22	1000	46	1000

DARLINGTON and MULTIPLE TRANSISTORS (continued)

QUAD ARRAYS (Dual-In-Line Ceramic and Dual-In-Line Plastic)

Package count and associated assembly costs can be reduced significantly with quad-packaged transistors. Each device contains four transistors in a plastic dual-in-line package (Table 4) or in a ceramic dual-in-line package (Table 5). The packages which are similar to the ones used for many integrated circuits are hermetic (ceramic) or plastic and can be easily handled by most automatic insertion equipment. Four matched transistors of a pair of PNP devices and a pair of NPN complements are available.

TABLE 4 – DUAL IN-LINE PLASTIC QUAD ARRAYS

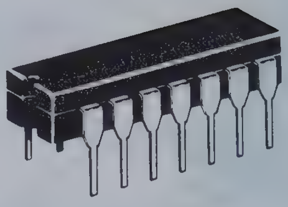


646
(Plastic)

Device Type	BV_{CEO} Volts@I_C		BV_{CBO} Volts@I_C		h_{FE}@I_C & V_{CE}			$V_{CE(sat)}$ Volts @ I_C & I_B			f_T @ I_C & f			t_{on} Typ Max* @ I_C		t_{off} Typ Max* @ I_C		NF dB typ
	Min	mA	Min	µA	— Min	mA	Volts	Max	mA	mA	MHz Min	mA	MHz	ns	mA	ns	mA	
NPN GENERAL-PURPOSE																		
MPQ918	15	3.0	30	1.0	20	3.0	1.0	0.4	10	1.0	600	4.0	100	–	–	–	–	6.0
MPQ2221	40	10	60	10	40	150	10	0.4	150	15	200	20	100	25	150	250	150	–
MPQ2222	40	10	60	10	100	150	10	0.4	150	15	200	20	100	25	150	250	150	–
MPQ2369	15	10	40	10	40	10	1.0	0.25	10	1.0	450	10	100	9.0	10	15	10	–
MPQ2483	40	10	60	10	150	1.0	5.0	0.5	10	1.0	50	0.5	20	–	–	–	–	3.0
MPQ2484	40	10	60	10	300	1.0	5.0	0.5	10	1.0	50	0.5	20	–	–	–	–	2.0
MPQ3904	40	1.0	60	10	75	10	1.0	0.2	10	1.0	250	10	100	37	10	136	10	–
PNP GENERAL-PURPOSE																		
MPQ2906	40	10	60	10	40	150	10	0.4	150	15	200	50	100	30	150	100	150	–
MPQ2907	40	10	60	10	100	150	10	0.4	150	15	200	50	100	30	150	100	150	–
MPQ3546	12	10	15	10	30	10	1.0	0.25	10	1.0	600	10	100	15	50	25	50	–
MPQ3798	40	10	60	10	150	0.5	5.0	0.2	0.1	0.01	60	1.0	100	–	–	–	–	2.5
MPQ3799	60	10	60	10	300	0.5	5.0	0.2	0.1	0.01	60	1.0	100	–	–	–	–	1.5
MPQ3906	40	1.0	40	10	75	10	1.0	0.25	10	1.0	200	10	100	43	10	155	10	–
NPN CORE DRIVER																		
MPQ3303	12	10	25	100	40	300	0.5	0.33	300	30	400	100	100	15*	1000	25*	1000	–
MPQ3725	40	10	60	10	25	500	2.0	0.45	500	50	250	50	100	35*	500	60*	500	–
MPQ3725A	50	10	60	100	25	500	2.0	0.45	500	50	200	50	100	35*	500	60*	500	–
MPQ4003	40	10	60	100	25	500	2.0	0.45	500	50	200	50	100	40*	500	75*	500	–
MPQ4004	50	10	60	100	25	500	2.0	0.45	500	50	200	50	100	40*	500	75*	500	–
PNP CORE DRIVER																		
MPQ3467	40	10	40	10	20	500	1.0	0.5	500	50	125	50	100	40*	500	90*	500	–
COMPLEMENTARY																		
MPQ6001	30	10	60	10	40	150	10	0.4	150	15	200	50	100	30	150	225	150	–
MPQ6002	30	10	60	10	100	150	10	0.4	150	15	200	50	100	30	150	225	150	–
MPQ6100	40	10	60	10	75	1.0	5.0	0.25	1.0	0.1	50	0.5	20	–	–	–	–	4.0
MPQ6100A	45	10	60	10	150	1.0	5.0	0.25	1.0	0.1	50	0.5	20	–	–	–	–	4.0

MPQ6001 is complementary 2N2222/2N2907 type.
MPQ6100 is complementary 2N2484/2N3799 type.

TABLE 5 – DUAL IN-LINE CERAMIC QUAD ARRAYS



632
(Ceramic)

Device Type	BV_{CEO} Volts @ I_C		BV_{CBO} Volts @ I_C		h_{FE} @ I_C & V_{CE}			$V_{CE(sat)}$ Volts @ I_C & I_B			f_T @ I_C & f			t_{on} Typ Max* @ I_C		t_{off} Typ Max* @ I_C		NF dB
	Min	mA	Min	µA	— Min	mA	Volts	Max	mA	mA	MHz Min	mA	MHz	ns	mA	ns	mA	typ
NPN-GENERAL-PURPOSE																		
MHQ918	15	3.0	30	1.0	20	3.0	1.0	0.4	10	1.0	600	4.0	100	–	–	–	–	6.0
MHQ2221	40	10	60	10	40	150	10	0.4	150	15	200	20	100	25	150	250	150	–
MHQ2222	40	10	60	10	100	150	10	0.4	150	15	200	20	100	25	150	250	150	–
MHQ2369	15	10	40	10	40	10	1.0	0.25	10	1.0	450	10	100	9.0	10	15	10	–
MHQ2483	40	10	60	10	150	1.0	5.0	0.5	10	1.0	50	0.5	20	–	–	–	–	3.0
MHQ2484	40	10	60	10	300	1.0	5.0	0.5	10	1.0	50	0.5	20	–	–	–	–	2.0
PNP-GENERAL-PURPOSE																		
MHQ2906	40	10	60	10	40	150	10	0.4	150	15	200	50	100	30	150	100	150	–
MHQ2907	40	10	60	10	100	150	10	0.4	150	15	200	50	100	30	150	100	150	–
MHQ3546	12	10	15	10	30	10	1.0	0.25	10	1.0	600	10	100	15	50	25	50	–
MHQ3798	40	10	60	10	150	0.5	5.0	0.2	0.1	0.01	60	1.0	100	–	–	–	–	2.5
MHQ3799	60	10	60	10	300	0.5	5.0	0.2	0.1	0.01	60	1.0	100	–	–	–	–	1.5
NPN-CORE DRIVER																		
MHQ4013	40	10	60	10	35	500	1.0	0.52	500	50	200	50	100	35*	500	60*	500	–
MHQ4014	45	10	70	10	35	500	1.0	0.52	500	50	200	50	100	35*	500	60*	500	–
MHQ4001A	40	10	60	10	30	500	1.0	0.52	500	50	200	50	100	40*	500	75*	500	–
MHQ4002A	45	10	70	10	30	500	1.0	0.52	500	50	200	50	100	40*	500	75*	500	–
PNP-CORE DRIVER																		
MHQ3467	40	10	40	10	20	500	1.0	0.5	500	50	125	50	100	40*	500	90*	500	–
COMPLEMENTARY																		
MHQ6001	30	10	60	10	40	150	10	0.4	150	15	200	50	100	30	150	225	150	–
MHQ6002	30	10	60	10	100	150	10	0.4	150	15	200	50	100	30	150	225	150	–
MHQ6100	40	10	60	10	75	1.0	5.0	0.25	1.0	0.1	50	0.5	20	–	–	–	–	4.0
MHQ6100A	45	10	60	10	150	1.0	5.0	0.25	1.0	0.1	50	0.5	20	–	–	–	–	4.0

MHQ6001 is complementary 2N2222/2N2907 type.
MHQ6100 is complementary 2N2484/2N3799 type.

RF TRANSISTORS

Motorola offers the industry's most complete selection of silicon RF transistors. In addition to NPN and PNP low-noise small-signal transistors and ultra-fast current-mode switches, Motorola can provide RF power transistors for all communications bands at frequencies to 1.0 GHz. Transistors are available for most applications in either polarity, NPN or PNP, with a wide range of power levels. Families of RF power transistors designed for optimum operation from a 12-volt supply are available for mobile communications applications.

Many of Motorola's RF power transistors are Balanced Emitter Transistors (BET). These multiple-emitter devices feature a thin-film nichrome resistor in series with each of the individual emitters. The effect of these resistors is to distribute the current equally among the emitters and reduce the localized heating that leads to second breakdown and destruction of the transistor. Thus the Balanced Emitter Transistors make ideal output devices by virtue of their ability to withstand large mismatches without danger of second breakdown.

This Selector Guide presents information on most of Motorola's small signal devices with f_T greater than 300 MHz and RF power devices with RF power outputs greater than 1.0 Watt at frequencies greater than 2.0 MHz. Other transistors for RF applications may be found in the Selector Guides for Small-Signal Hermetic Transistors and Plastic Encapsulated Small-Signal Silicon Transistors.

Four tables in this Selector Guide cover the major application categories:

RF Power Amplifiers . . . . **Table 1**
. . . a wide variety of devices for communications and general amplifier applications.

Low-Noise Small-Signal Amplifiers . . . . **Table 2**
. . . including devices designed specifically for CATV applications.

UHF and Microwave Oscillators . . . . **Table 3**
. . . provide high outputs at frequencies to 2.0 GHz.

High-Speed Current-Mode Switches . . . . **Table 4**
. . . ultra-fast switching for instrumentation applications.

INDEX

The following table is a numerical-alphabetical index to Silicon RF transistors manufactured by Motorola. The number of the selection table in which each device is further characterized is also listed.

Device Type	Package	Table	Device Type	Package	Table	Device Type	Package	Table
2N2857*	TO-72	2,3	2N3950	TO-60	1	2N5179	TO-72	2,3
2N2947	TO-3	1	2N3959*	TO-18	4	2N5583	TO-39	4
2N2948	TO-3	1	2N3960*	TO-18	4	2N5589	144B-02	1
2N2949	TO-107	1	2N3961	TO-102	1	2N5590	145A-01	1
2N2950	TO-102	1	2N4012	TO-60	1	2N5591	145A-01	1
2N3137	TO-5	1	2N4072	TO-18	1	2N5635	144B-02	1
2N3287	TO-72	2	2N4073	TO-5	1	2N5636	144B-02	1
2N3291	TO-72	2	2N4130	TO-3	1	2N5637	145A-01	1
2N3292	TO-72	2	2N4427	TO-39	1	2N5641	144B-02	1
2N3294	TO-72	2	2N4957	TO-72	2	2N5642	145A-01	1
2N3296	TO-102	1	2N4958	TO-72	2	2N5643	145A-01	1
2N3297	TO-3	1	2N4959	TO-72	2	2N5644	145A-01	1
2N3375*	TO-60	1	2N5016	TO-60	1	2N5645	145A-01	1
2N3553*	TO-39	1	2N5031	TO-72	2	2N5646	145A-01	1
2N3632	TO-60	1	2N5032	TO-72	2	2N5829	TO-72	2
2N3839	TO-72	2	2N5070	TO-60	1	2N5835	TO-72	4
2N3866*	TO-39	1,2	2N5071	TO-60	1	2N5836	TO-46	4
2N3866A*	TO-39	1	2N5090	TO-60	1	2N5837	TO-46	4
2N3924	TO-39	1	2N5108	TO-39	1,3	2N5841	TO-72	4
2N3925	TO-102	1	2N5109	TO-39	2	2N5842	TO-72	4
2N3926	TO-60	1	2N5160	TO-39	1	2N5846	TO-102	1
2N3927	TO-60	1	2N5161	TO-60	1	2N5847	145A-01	1
2N3948	TO-39	1	2N5162	TO-60	1	2N5848	145A-01	1

*JAN and JANTX Type, also available

RF TRANSISTORS (continued)

INDEX (continued)

Device Type	Package	Table	Device Type	Package	Table	Device Type	Package	Table
2N5849	145A-02	1	2N6256	249-01	1	MM8011	TO-107	3
2N5862	145A-02	1	2N6304	TO-72	2	MRF207	TO-39	1
2N5942	211-02	1	2N6305	TO-72	2	MRF208	145A-01	1
2N5943	TO-39	2	2N6366	TO-102	1	MRF209	145A-01	1
2N5944	244-01	1	2N6367	211-01	1	MRF215	278-04	1
2N5945	244-01	1	2N6368	211-01	1	MRF216	278-04	1
2N5946	244-01	1	2N6370	211-01	1	MRF304	278-03	1
2N5947	144D-01	2	MM1500	TO-107	3	MRF305	278-03	1
2N6080	145A-01	1	MM1501	TO-107	3	MRF501	TO-72	2
2N6081	145A-01	1	MM1553	145C-01	1	MRF502	TO-72	2
2N6082	145A-01	1	MM4018	TO-39	1	MRF509	207A-01	1
2N6083	145A-01	1	MM4019	TO-39	1	MRF603	145A-01	1
2N6084	145A-01	1	MM4049	TO-72	4	MRF607	TO-39	1
2N6094	211-01	1	MM8000	TO-39	2	MRF618	278-01	1
2N6095	211-01	1	MM8001	TO-39	2	MRF619	278-01	1
2N6096	211-01	1	MM8006	TO-72	2	MRF620	278-01	1
2N6097	211-01	1	MM8007	TO-72	2	MRF5177	215	1
2N6136	145A-01	1	MM8008	TO-107	3	MRF8004	TO-39	1
2N6166	211-02	1	MM8009	TO-39	1,3			
2N6255	TO-39	1	MM8010	TO-107	3			

* JAN and JANTX Type, also available

TABLE 1 – RF POWER AMPLIFIERS

A wide variety of devices for communications and general amplifier applications. The transistors are listed first in order of increasing test frequency; then in order of increasing output power rating.

Test Conditions f MHz	@ V_{CC} Volts	P_{out} Watts Min	Power Gain dB Min	BV_{CBO} Volts Min	Package	Device Type
NPN						
27	12.5	3.5	10	60	TO-39	MRF8004
30	12.5	2.5PEP	17	36	TO-102	2N6366
30	30	3.0PEP	16	60	TO-102	2N3296
30	12.5	9.0PEP	14	18	211-01	2N6367
30	28	10PEP	12	65	211-01	2N6370
30	30	12PEP	10	60	TO-3	2N3297
30	25	15	7.0	40	TO-3	2N2948
30	28	25PEP	13	65	TO-60	2N5070
30	12.5	40PEP	10	36	211-01	2N6368
30	28	40PEP	13	65	211-01	2N5941
30	28	80PEP	13	65	211-02	2N5942
50	12.5	3.5	10	36	TO-102	2N5846
50	25	3.5	10	60	TO-107	2N2949
50	25	3.5	10	60	TO-102	2N2950
50	12.5	8.0	10	36	145A-01	2N5847
50	25	15	7.0	60	TO-3	2N2947
50	12.5	20	8.0	48	145A-01	2N5848
50	12.5	40	7.5	48	145A-02	2N5849
50	28	50	8.0	65	TO-60	2N3950
70	28	50	8.0	80	TO-3	2N4130
76	28	24	9.0	65	TO-60	2N5071
100	28	7.5	8.8	65	TO-60	2N3375†
150	27	75	7.0	65	145A-02	2N5862
150	44	75	8.2	100	145C-01	MM1553
150	28	100	4.5	65	211-02	2N6166
175	13.6	0.25	10	40	TO-18	2N4072
175	13.6	0.5	10	40	TO-39	2N4073
175	12	1.0	10	40	TO-39	2N4427
175	12.5	1.75	12.5		TO-39	MRF607
175	28	2.5	10	65	TO-39	2N3553†
175	12.5	3.0	7.8	36	TO-39	2N6255
175	13.6	3.0	8.2	36	144B-03	2N5589
175	12.5	4.0	12	36	145A-01	2N6080
175	13.6	4.0	6.0	36	TO-39	2N3924
175	28	4.0	9.0	65	TO-102	2N3961
175	13.6	5.0	5.9	36	TO-102	2N3925
175	13.6	7.0	5.5	36	TO-60	2N3926
175	28	7.0	8.4	65	144B-03	2N5641

† JAN Types Also Available
‡ Tripler Output

RF TRANSISTORS (continued)

TABLE 1 (continued)

Test Conditions f MHz	@ V_{CC} Volts	P_{out} Watts Min	Power Gain dB Min	BV_{CBO} Volts Min	Package	Device Type
NPN (continued)						
175	12.5	10	10		145A-01	MRF603
175	13.6	10	5.2	36	145A-01	2N5590
175	13.6	12	4.8	36	TO-60	2N3927
175	28	13.5	5.9	65	TO-60	2N3632
175	12.5	15	6.3	36	145A-01	2N6081
175	12.5	20	8.2		278-04	MRF215
175	28	20	8.2	65	145-01	2N5642
175	12.5	25	6.2	36	145A-01	2N6082
175	13.6	25	4.4	36	145A-01	2N5591
175	12.5	30	5.7	36	145A-01	2N6083
175	12.5	40	6.7		278-04	MRF216
175	12.5	40	4.5	36	145A-01	2N6084
220	12.5	1.0	8.2	36	TO-39	MRF207
220	12.5	10	10	36	145A-01	MRF208
220	12.5	25	4.4	36	145A-01	MRF209
175	28	40	7.6	65	145A-01	2N5643
250	20	0.4	6.0	40	TO-39	2N3137
400	28	1.0	10	55	207A-01	MRF509
400	28	1.0	10	55	TO-39	2N3866
400	28	1.0	10	55	TO-39	2N3866A
400	13.6	1.0	6.0	36	TO-39	2N3948
400	28	1.2	5.5	55	TO-60	2N5090
400	28	2.5	6.2	60	144B-03	2N5635
400	28	7.5	5.7	60	144B-03	2N5636
400	28	10	9.0		278-03	MRF304
400	28	15	4.8	65	TO-60	2N5016
400	28	20	4.6	60	145A-01	2N5637
400	28	30	8.0		278-03	MRF305
400	28	30	6.0	60	215	MRF5177
470	12.5	0.5	7.0	36	249-01	2N6256
470	12.5	1.0	7.0	36	145A-01	2N5644
470	12.5	2.0	9.0	36	244-01	2N5944
470	12;5	4.0	8.0	36	244-01	2N5945
470	12;5	4.0	6.0	36	145A-01	2N5945
470	12;5	10	6.0	36	244-01	2N5946
470	12.5	12	4.7	36	145A-01	2N5646
470	12.5	25	4.0	36	145A-01	2N6136
470	12.5	25	5.22	16	278-01	MRF619
470	12.5	35	4.3	16	278-01	MRF620
500	28	0.75	10	55	TO-39	2N4428
520	12.5	15	6.0	36	278-01	MRF618
1000	28	0.9	4.5	55	TO-39	MM8009
1000	28	1.0	5.0	55	TO-39	2N5108
1000	28	2.5‡		65	TO-60	2N4012
PNP						
175	12.5	0.5	10	40	TO-39	MM4018
175	28	2.5	10	60	TO-39	MM4019
175	12.5	4.0	12	36	211-01	2N6094
175	28	7.5	8.8	60	TO-60	2N5161
175	12.5	15	6.3	36	211-01	2N6095
175	12.5	30	5.7	36	211-01	2N6096
175	28	30	6.0	60	TO-60	2N5162
175	12.5	40	4.5	36	211-01	2N6097
400	28	1.0	8.0	60	TO-39	2N5160

† JAN Types Also Available
‡ Tripler Output

TABLE 2 – LOW-NOISE SMALL-SIGNAL AMPLIFIERS

Including devices designed specifically for CATV applications. The transistors are listed first in order of increasing test frequency, then in order of increasing noise figure.

Test Conditions f MHz	@ V_{CE} Volts	NF dB Max	Power Gain dB Min	f_T MHz Min	Package	Device Type
NPN						
200	15	2.7*	11.4*	700	TO-39	MM8000
200	15	2.7*	11.4*	900	TO-39	MM8001
200	15	3.0*	11	1200	TO-39	2N5109
200	6.0	4.0*	17*	800	TO-72	MRF502
200	6.0	4.5*	15*	600	TO-72	MRF501
200	6.0	4.5	15	900	TO-72	2N5179
200	10	6.0	17	350	TO-72	2N3287
200	10	7.0*	14	250	TO-72	2N3294
200	15	8.0	11.4*	1200	TO-39	2N5943
200	10	8.0	16	250	TO-72	2N3291
200	20	8.5	10	1100	144D-01	2N5947
200	10	9.0	16	250	TO-72	2N3292
450	6.0	2.5	14	1000	TO-72	2N5031
450	6.0	3.0	14	1000	TO-72	2N5032
450	6.0	3.4	12.5	1000	TO-72	2N3839
450	6.0	3.8	14	1000	TO-72	MM8006
450	6.0	4.5	12.5	1000	TO-72	2N2857†
450	5.0	4.5	12	1200	TO-72	2N6305
450	6.0	5.0	12	1000	TO-72	MM8007
450	5.0	5.5	15	1400	TO-72	2N6304
PNP						
450	10	2.5	17	1200	TO-72	2N5829
450	10	3.0	17	1200	TO-72	2N4957
450	10	3.3	16	1000	TO-72	2N4958
450	10	3.8	15	1000	TO-72	2N4959

*Typical
†JAN Type Also Available

TABLE 3 – UHF and MICROWAVE OSCILLATORS

The transistors are listed first in order of increasing test frequency; then in order of increasing oscillator output power.

Test Conditions f MHz	@ V_{CE} Volts	P_{out} (Oscillator) mW Min	f_T MHz Min	BV_{CBO} Volts Min	Package	Device Type
NPN						
500	10	20	900	20	TO-72	2N5179
500	10	30	1000	30	TO-72	2N2857†
1500	20	150	1000*	30	TO-107	MM1501
1500	20	250	1500*	30	TO-107	MM1500
1680	20	300*	1000	55	TO-39	MM8009
1680	20	300*	1200	55	TO-39	2N5108
2000	20	100	1100*	35	TO-107	MM8011
2000	20	200	1100*	35	TO-107	MM8010
2000	20	300	1100*	35	TO-107	MM8008

*Typical †JAN Type Also Available

TABLE 4 – HIGH-SPEED CURRENT MODE SWITCHES

Ultra-fast switching for instrumentation applications is provided by these devices which feature high f_T and low $r_b'C_c$ over a wide range of collector current. The transistors are listed first in order of increasing collector current (test) and then in order of increasing f_T.

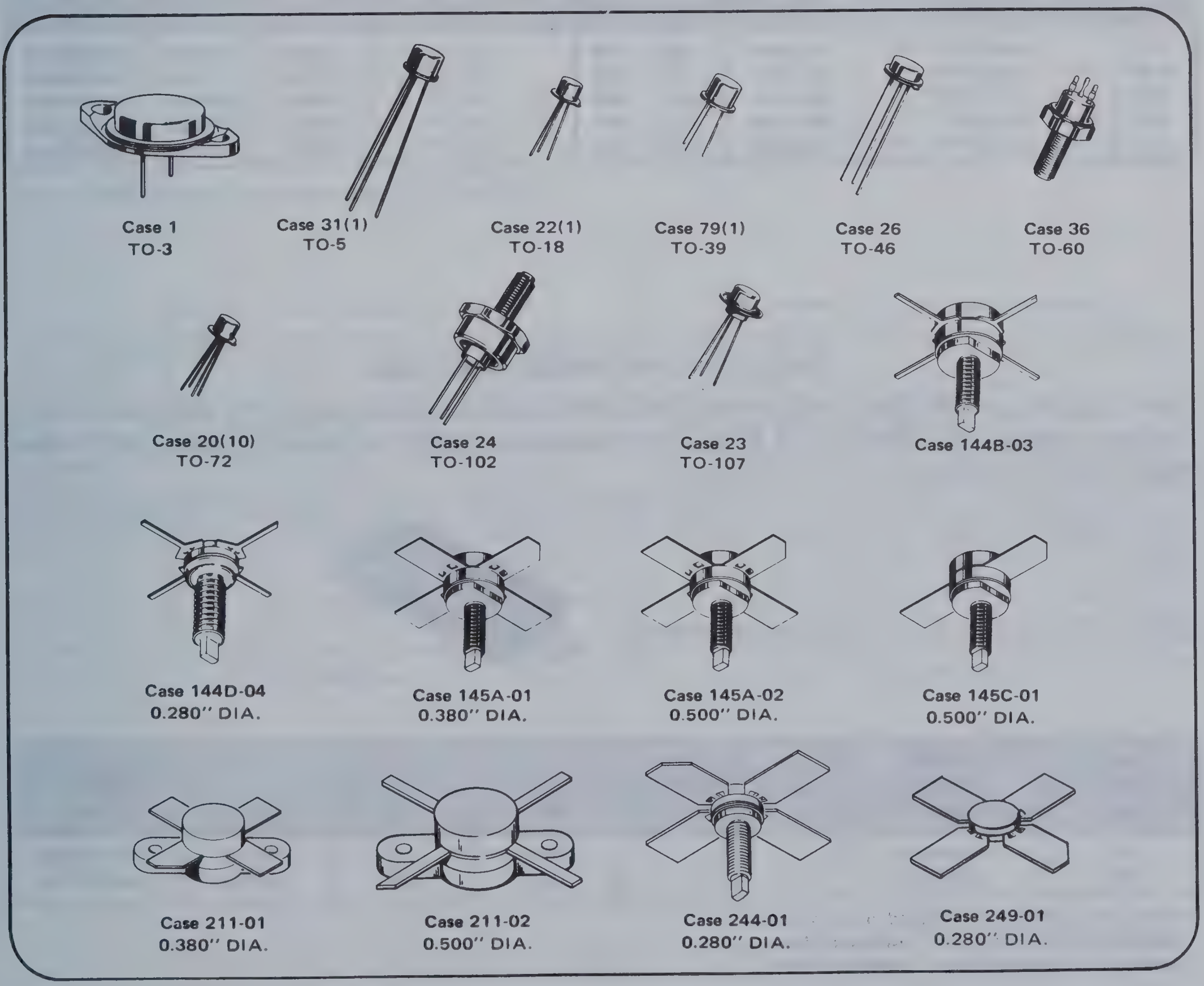
Test Conditions I_C mA	@ V_{CE} Volts	f_T MHz Min	$r_b'C_c$ ps Max	C_{cb} pF Max	Package	Device Type
NPN						
10	10	1300	25	2.5**	TO-18	2N3959†
10	10	1600	40	2.5**	TO-18	2N3960†
10	6.0	2500	5.0*	0.8	TO-72	2N5835
25	4.0	1700	40	1.5	TO-72	2N5842
25	4.0	2200	25	1.5	TO-72	2N5841
50	6.0	2000	6.0*	3.5	TO-46	2N5836
100	3.0	1700	6.0*	5.0	TO-46	2N5837
PNP						
25	5.0	4000	15	1.25**	TO-72	MM4049
100	10	1300	8.0*	5.0	TO-39	2N5583

*Typical

**C_{ob}

†JAN Types Also Available

RF transistors are available in a variety of packages for many applications.



Case 1
TO-3

Case 31(1)
TO-5

Case 22(1)
TO-18

Case 79(1)
TO-39

Case 26
TO-46

Case 36
TO-60

Case 20(10)
TO-72

Case 24
TO-102

Case 23
TO-107

Case 144B-03

Case 144D-04
0.280″ DIA.

Case 145A-01
0.380″ DIA.

Case 145A-02
0.500″ DIA.

Case 145C-01
0.500″ DIA.

Case 211-01
0.380″ DIA.

Case 211-02
0.500″ DIA.

Case 244-01
0.280″ DIA.

Case 249-01
0.280″ DIA.

RF MODULES

Motorola has the capability to produce many diverse types of modules for high-frequency and high-power performance.

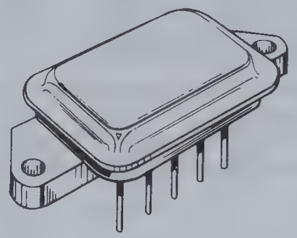
These modules offer advantages in miniaturization, performance, economy, flexibility and reliability.

This section lists standard RF modules.

TABLE 1 – WIDEBAND AMPLIFIER MODULES

These modules are designed for amplifier applications in CATV distribution equipment. The devices are listed in increasing order of Noise Figure (NF).

Case 270-01

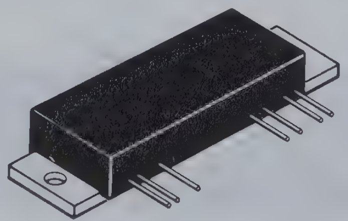


NF dB Max	Output Level dB/mV/N-Channel	Frequency Range MHz	G_p dB Min	IMD dB Max	Input and Output Return Loss @ z_o = 75 Ohms Min	P_D Watts Max	Case	Device Case
7.5	47/21	40-300	15	-69	16	5.0	270-01	MHW559
8.5	44/21	40-300	14.5	-62	16	5.0	270-01	MHW560
10	51/12	3-120	15	-66	16	4.5	270-01	MHW563
10	47/21	40-300	14	-69	16	6.0	270-01	MHW562
12	50/21	40-300	14	-69	16	6.0	270-01	MHW561

TABLE 2 – UHF POWER MODULES

These modules are designed for Land Mobile Communications equipment in the UHF band with a frequency range* of 400 to 470 MHz. The devices are listed in increasing order of Output Power (P_{out}).

CASE 700-01



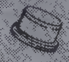
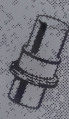
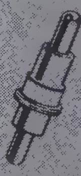
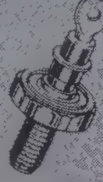
P_{out} Watts Min	Frequency Range MHz	Z_{in} Z_o = 50 Ohms Max	G_p dB Min	η % Min	Case	Device Type
7.5	400-470	2:1	18.8	35	700-01	MHW709
13	400-470	2:1	19.4	35	700-01	MHW710

*Frequency Range is covered in two bands:
MHW709-1, MHW710-1 400-440 MHz
MHW709-2, MHW710-2 440-470 MHz

MICROWAVE DEVICES

POWER VARACTOR MULTIPLIERS

Varactor multipliers take over at frequencies where transistors leave off. Motorola's line of step-recovery multipliers represents a selection of the more popular frequency doublers, triplers and high-order type. Output capabilities range from 15 watts to 450 MHz to 1 watt at 10 GHz. The table is arranged in order of decreasing output frequency.

f_{out} GHz	P_{out} Min Watts	f_{in} GHz	P_{in} Watts	 CASE 48	 CASE 46	 CASE 47	 CASE 44
10	1.0	5.0	2.6	MV1812A	MV1812B	—	—
6.4	0.25	0.8	1.0	MV1817A1	MV1817B1	—	—
6.4	0.2	0.8	1.0	MV1817A	MV1817B	—	—
6.0	2.0	2.0	5.0	MV1810A1	MV1810B1	—	—
6.0	2.0	2.0	5.0	MV1810A	MV1810B	—	—
6.0	2.0	2.0	5.0	—	MV1810B2	—	—
6.0	2.0	2.0	5.0	—	MV1810B3	—	—
4.0	7.2	2.0	12	MV1811A1	MV1811B1	MV1811C1	MV1811J1
4.0	5.0	2.0	10	MV1811A	MV1811B	MV1811C	MV1811J
2.4	0.75	0.3	3.0	MV1816A1	MV1816B1	—	—
2.4	0.6	0.3	3.0	MV1816A	MV1816B	—	—
2.0	14.5	1.0	25	—	—	MV1809C1	MV1809J1
2.0	10	1.0	20	—	—	MV1809C	MV1809J
2.0	7.2	1.0	12	MV1808A1	MV1808B1	MV1808C1	MV1808J1
2.0	6.0	1.0	12	MV1808A	MV1808B	MV1808C	MV1808J
1.0	25	0.5	37	—	—	MV1807C1	MV1807J1
1.0	25	0.5	37	—	—	MV1807C2	—
1.0	25	0.5	37	—	—	MV1807C3	—
1.0	24	0.5	37	—	—	MV1807C	MV1807J
1.0	11	0.5	20	—	—	MV1806C	MV1806J
0.75	26	0.25	40	—	—	MV1805C	MV1805J
0.45	15	0.15	30	—	—	MV1804C	MV1804J

Note: Dash numbers indicate capacitance selection

FIGURE 1 – Typical Doubling Performance

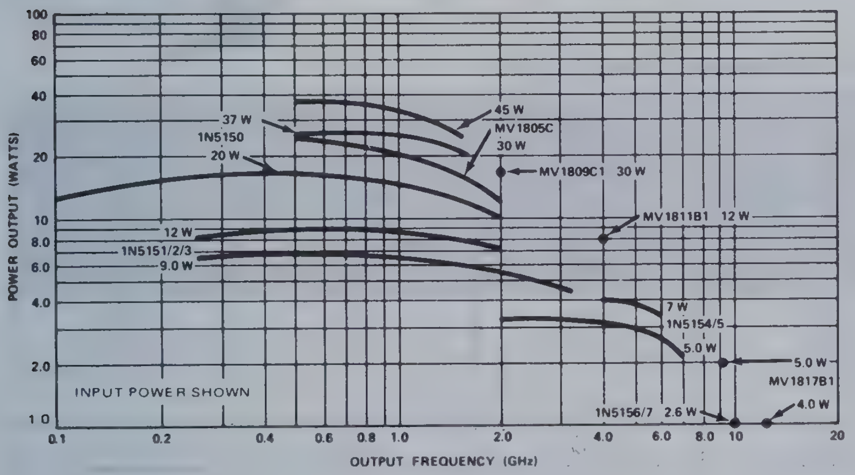
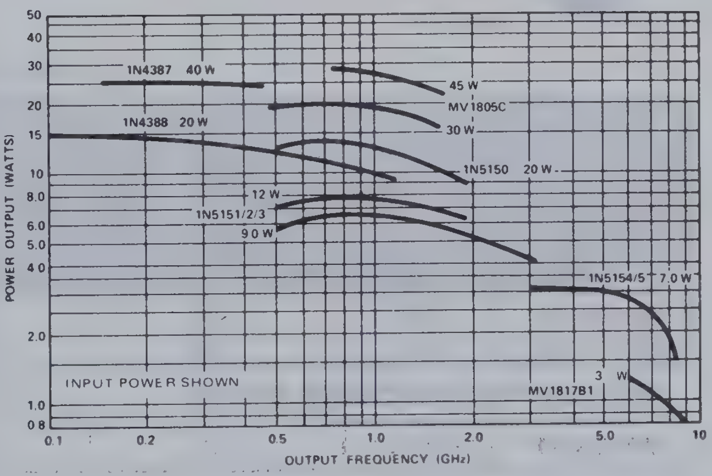


FIGURE 2 – Typical Tripling Performance



MICROWAVE DEVICES (continued)

1N/MV CROSS REFERENCE

Case 48	Case 46	Case 47	Case 44
MV1812A/1N5156	MV1812B/1N5157	MV1806C/1N5149	MV1804J/1N4387
MV1808A/1N5151	MV1808B/1N5152	MV1807C/1N5150	MV1806J/1N4388
MV1810A/1N5154	MV1808B1/1N5152A	MV1807C1/1N5150A	
	MV1810B/1N5155	MV1808C/1N5153	
	MV1810B1/1N5155A	MV1808C1/1N5153A	
	MV1812B/1N5157		

PIN SWITCHING DIODES

PIN switching diodes designed for VHF band switching and general-purpose switching. Supplied in the low-inductance Mini-L package and ideal for low-cost, high-volume requirements.

Case 226

Case 166-02 (Micro-I)

ELECTRICAL CHARACTERISTICS

Device Type	Case	$V_{(BR)R}$ I_R = 10 μAdc Volts Min	R_S I_F = 10 mAdc Ohms Max	C_T V_R = 20 V f = 1.0 MHz pF Max	L_S f = 250 MHz nH Typ	C_C f = 1.0 MHz pF Typ
MPN3401	226	35	0.7	1.0	3.0	1.0
MPN3402	226	35	0.6	2.0	3.0	1.0

MICRO-I PIN SWITCHING DIODE

MPI-3401	166-01	35	0.7	1.0	3.0	0.15

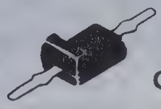
MICROWAVE DEVICES (continued)

DUAL EPICAP TUNING DIODE

CASE 29(15)
TO-92

Device Type	C_T, Diode Capacitance f = 1.0 MHz V_R = 3.0 Vdc, pF		C_R, Capacitance Ratio C_3/C_{30} f = 1.0 MHz		Q, Figure of Merit V_R = 3.0 Vdc f = 100 MHz
	Min	Max	Min	Max	Min
MV104	37	42	2.5	2.8	100

MINI-L ABRUPT JUNCTION TUNING DIODES



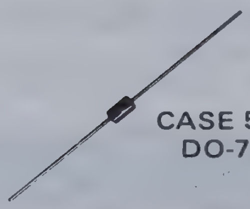
CASE 226

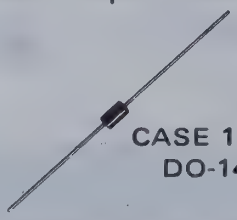
Device Type	C_T Diode Capacitance V_R = 4.0 Vdc, f = 1.0 MHz pF Min/Max	C_R, Capacitance Ratio C2/C30 f = 1.0 MHz Min	Q, Figure of Merit V_R = 4.0 Vdc, f = 100 MHz Min
MV3501	6.1/7.5	2.7	225
MV3502	7.4/9.0	2.8	225
MV3503	9.0/11	2.8	200
MV3504	10.8/13.2	2.8	200
MV3505	13.5/16.5	2.9	200
MV3506	16.2/19.8	2.9	175
MV3507	19.8/24.2	2.9	175

EPICAP TUNING DIODES

(Voltage-Variable Capacitance Diodes)

CASE 45


CASE 51
DO-7


CASE 146
DO-14

CASE 166-02

CASE 182

Nominal Capacitance pF @ V_R = 4.0 V, f = 1.0 MHz	Device Type	Capacitance Ratio @		Q @ 4.0 V, f = 50 MHz f = 100 MHz* f = 20 MHz† Min	Maximum Working Voltage	Case
		pF Min/Typ Min/Max*	V1/V2			
1.0	MV1858D (1)	2.1/2.7	C4/C60	350*	60	45
2.2	MV1860D (2)	2.5/3.1	C4/C60	350*	60	45
3.3	MV1862D	2.6/3.3	C4/C60	300*	60	45
4.7	MV1863D	2.6/3.3	C4/C60	300*	60	45
6.8	MV1864D	2.7/3.4	C4/C60	300*	60	45
	1N5139 (3)	2.7/2.9	C4/C60	350	60	51
	1N5461A (4)	2.7/3.1*	C2/C30	600	30	51
	1N5441A (4)	2.5/3.1*	C2/C30	450	30	51
	MV2101	2.5/3.2*	C2/C30	450	30	182
	MV2201	1.9/2.3*	C1/C10	300	25	182
	MV1620	2.0/2.2	C2/C20	300	20	51
8.2	MV1865D	2.7/3.4	C4/C60	300*	60	45
	1N5462A (4)	2.8/3.1*	C2/C30	600	30	51
	1N5442A (4)	2.5/3.1*	C2/C30	450	30	51
	MV2102	2.5/3.2*	C2/C30	450	30	182
	MV1622	2.0/2.2	C2/C20	300	20	51
10	MV1866D	2.8/3.5	C4/C60	250*	60	45
	1N5140 (3)	2.8/3.0	C4/C60	300	60	51
	MV1866	3.0/3.1*	C4/C60	500	60	51
	1N5463A (4)	2.8/3.1*	C2/C30	550	30	51
	1N5443A (4)	2.6/3.1*	C2/C30	400	30	51
	MV2103	2.5/3.2*	C2/C30	400	30	182
	MV2203	2.0/2.4*	C1/C10	200	25	182
	MV1624	2.0/2.3	C2/C20	300	20	51
12	MV1868D	2.8/3.5	C4/C60	200*	60	45
	1N5141 (3)	2.8/3.0	C4/C60	300	60	51
	MV1868	3.0/3.1*	C4/C60	500	60	51
	1N5464 (4)	2.8/3.1*	C2/C30	550	30	51
	1N5444A (4)	2.6/3.1*	C2/C30	400	30	51
	MV2104	2.5/3.2*	C2/C30	400	30	182
	MV1626	2.0/2.3	C2/C20	300	20	51
15	MV1870D	2.8/3.5	C4/C60	200*	60	45
	1N1542 (3)	2.8/3.0	C4/C60	250	60	51
	MV1870	3.0/32.*	C4/C60	400	60	51
	1N5465A (4)	2.8/3.1*	C2/C30	550	30	51
	1N5445A (4)	2.6/3.1*	C2/C30	400	30	51
	MV2105	2.5/3.2*	C2/C30	400	30	182
	MV830	1.8/2.0	C4/C25	30	30	51
	MV2205	2.1/2.5*	C1/C10	200	25	182
	MV1628	2.0/2.3	C2/C20	250	20	51
18	1N5143 (3)	2.8/3.0	C4/C60	250	60	51
	MV1871	3.0/3.2*	C4/C60	400	60	51
	1N5466A (4)	2.9/3.1*	C2/C30	500	30	51
	1N5446A (4)	2.7/3.1*	C2/C30	350	30	51
	MV2106	2.5/3.2*	C2/C30	350	30	182
	MV831	1.8/2.0	C4/C25	25	30	51
	MV1630	2.0/2.3	C2/C20	250	20	51

See footnote on page 5-92

EPICAP TUNING DIODES (continued)

Nominal Capacitance pF @ V_R = 4.0 V, f = 1.0 MHz	Device Type	Capacitance Ratio @		Q @ 4.0 V, f = 50 MHz f = 100 MHz* f = 20 MHz† Min	Maximum Working Voltage	Case
		pF Min/Typ Min/Max*	V1/V2			
20	1N5467A (4)	2.9/3.1*	C2/C30	500	30	51
	1N5447A (4)	2.6/3.1*	C2/C30	350	30	51
	MV1632	2.0/2.3	C2/C20	250	20	51
22	1N5144 (3)	3.2/3.4	C4/C60	200	60	51
	MV1872	3.2/3.3*	C4/C60	400	60	51
	1N5468A (4)	2.9/3.2*	C2/C30	500	30	51
	1N5448A (4)	2.6/3.2*	C2/C30	350	30	51
	MV2107	2.5/3.2*	C2/C30	350	30	182
	MV832	1.8/2.1	C4/C25	25	30	51
	MV1634	2.0/2.3	C2/C20	250	20	51
27	1N5145 (3)	3.2/3.4	C4/C60	200	60	51
	MV1874	3.2/3.3*	C4/C60	300	60	51
	1N5469A (4)	2.9/3.2*	C2/C30	500	30	51
	1N5449A (4)	2.6/32.*	C2/C30	350	30	51
	MV2108	2.5/3.2*	C2/C30	300	30	182
	MV833	1.8/2.1	C4/C25	25	30	51
	MV1636	2.0/2.3	C2/C20	200	20	51
29	MV209 (1)	5.0/6.5*	C3/C25	200	30	182
33	1N5146 (3)	3.2/3.4	C4/C60	200	60	51
	MV1876	3.2/3.4*	C4/C60	300	60	51
	1N5470A (4)	2.9/3.2*	C2/C30	500	30	51
	1N5450A (4)	2.6/3.2*	C2/C30	350	30	51
	MV2109	2.5/3.2*	C2/C30	200	30	182
	MV834	1.9/2.12	C4/C25	20	30	51
	MV2209	2.1/2.5*	C1/C10	150	25	182
	MV1638	2.0/2.4	C2/C20	200	20	51
39	1N5147 (3)	3.2/3.4	C4/C60	200	60	51
	MV1877	3.2/3.4*	C4/C60	300	60	51
	1N5471A (4)	2.9/3.2*	C2/C30	450	30	51
	1N5451A (4)	2.6/3.2*	C2/C30	300	30	51
	MV2110	2.5/3.2*	C2/C30	150	30	182
	MV835	1.9/2.12	C4/C25	20	30	51
	MV1640	2.0/2.4	C2/C20	200	20	51
47	1N5148 (3)	3.2/3.4	C4/C60	200	60	51
	MV1878	3.2/3.4*	C4/C60	300	60	51
	1N5472A (4)	2.9/3.2*	C2/C30	400	30	51
	1N5452A (4)	2.6/3.2*	C2/C30	250	30	51
	MV2111	2.5/3.2*	C2/C30	150	30	182
	MV836	1.9/2.15	C4/C25	15	30	51
	MV1642	2.0/2.4	C2/C20	200	20	51
56	1N5473A (4)	2.9/3.3*	C2/C30	300	30	51
	1N5453A (4)	2.6/3.3*	C2/C30	200	30	51
	MV2112	2.6/3.3*	C2/C30	150	30	182
	MV837	1.9/2.15	C4/C25	15	30	51
	MV1644	2.0/2.4	C2/C20	150	20	51
68	1N5474A (4)	2.9/3.3*	C2/C30	250	30	51
	1N5454A (4)	2.7/3.3*	C2/C30	175	30	
	MV2113	2.6/3.3*	C2/C30	150	30	182
	MV838	2.0/2.18	C4/C25	15	30	51
	MV1646	2.0/2.4	C2/C20	150	20	51
82	1N5475A (4)	2.9/3.3*	C2/C30	225	30	51
	1N5455A (4)	2.7/3.3*	C2/C30	175	30	51
	MV2114	2.6/3.3*	C2/C30	100	30	182
	MV839	2.0/2.18	C4/C25	10	30	51
	MV1648	2.0/2.4	C2/C20	150	20	51

See footnote on page 5-92

EPICAP TUNING DIODES (continued)

Nominal Capacitance pF @ V_R = 4.0 V, f = 1.0 MHz	Device Type	Capacitance Ratio @		Q @ 4.0 V, f = 50 MHz f = 100 MHz* f = 20 MHz† Min	Maximum Working Voltage	Case
		pF Min/Typ Min/Max*	V1/V2			
100	1N5476A (4)	2.9/3.3*	C2/C30	200	30	51
	1N5456A (4)	2.7/3.3*	C2/C30	175	30	51
	MV2115	2.6/3.3*	C2/C30	100	30	182
	MV840	2.0/2.18	C4/C25	10	30	51
	MV1650	2.0/2.4	C2/C20	150	20	51
120	MV1652	–/2.6	C2/C20	250†	20	146
	MV2301	2.3/–	C2/C20	250†	20	182
150	MV1654	–/2.6	C2/C20	250†	20	146
	MV2302	2.3/–	C2/C20	250†	20	182
180	MV1656	–/2.6	C2/C20	200†	20	146
	MV2303	2.3/–	C2/C20	200†	20	182
200	MV1658	–/2.6	C2/C20	200†	20	146
	MV2304	2.3/–	C2/C20	200†	20	182
220	MV1660	–/2.6	C2/C20	150†	20	146
	MV2305	2.3/–	C2/C20	150†	20	182
250	MV1662 (5)	–/2.3	C2/C20	150†	20	146
	MV2306	2.3/–	C2/C20	150†	20	182
270	MV1664 (5)	–/2.3	C2/C20	100†	20	146
	MV2307	2.3/–	C2/C20	100†	20	182
330	MV1666 (5)	–/2.3	C2/C20	100†	20	146
	MV2308	2.3/–	C2/C20	100†	20	182

(1) $C_T = \pm 30\%$

(2) $C_T = \pm 20\%$

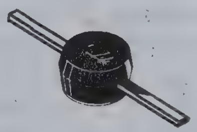
(3) Add Suffix "A" for ± 50% C_T Tolerance

(4) Substitute "B" Suffix for ± 50% C_T. Tolerance "C" Suffix for ± 20% C_T

(5) Capacitance Ratio is C2/C15

SILICON EPICAP MICRO-I DIODES

. . . designed in the popular PLASTIC PACKAGE for high volume requirements of FM Radio and TV tuning and AFC, general frequency control and tuning applications; providing solid-state reliability in replacement of mechanical tuning methods.



CASE 166-02

Device	C_T, Diode Capacitance V_R = 4.0 Vdc, f = 1.0 MHz pF			Q, Figure of Merit V_R = 4.0 Vdc f = 100 MHz	TR, Tuning Ratio C_2/C_{30} f = 1.0 MHz		Color Code	
	Min	Nom	Max	Min	Min	Max	Top	Bottom
MVI-2097	0.8	1.0	1.2	325	2.0	2.4	None	None
MVI-2098	1.8	2.2	2.7	325	2.0	2.8	None	Brown
MVI-2099	2.6	3.3	4.0	300	2.2	2.9	None	Red
MVI-2100	3.7	4.7	5.7	300	2.4	2.9	None	Orange
MVI-2101	6.1	6.8	7.5	275	2.5	3.3	None	Yellow
MVI-2102	7.3	8.2	9.0	275	2.6	3.3	None	Green
MVI-2103	9.0	10	11	275	2.6	3.3	None	Blue
MIV-2104	10.8	12	13.2	275	2.6	3.3	None	Violet
MVI-2105	13.5	15	16.5	275	2.6	3.3	None	Gray
MVI-2106	16.2	18	19.8	250	2.7	3.3	None	White
MVI-2107	19.8	22	24.2	200	2.7	3.3	Brown	None
MVI-2108	24.3	27	29.7	200	2.7	3.3	Brown	Brown
MVI-2109	29.7	33	36.3	200	2.7	3.3	Brown	Red

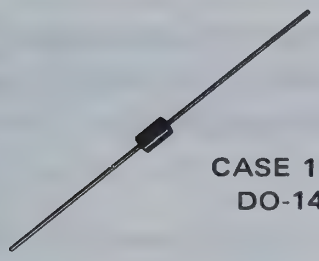
TUNING DIODE REGULATOR

CASE 182-01

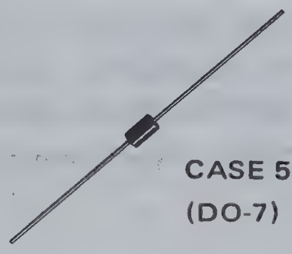
Highly reliable temperature compensated monolithic integrated circuit voltage stabilizer designed for use in television and FM radios that use variable capacitance diode tuners.

Device Type	V_Z Volts Min/Max	I_Z mA	$\frac{\Delta V_Z}{\Delta T}$ mV/°C Min/Max	Z_Z Ohms Max	P_D mW
MVS460	31/35	18	-3.1/+1.55	25	625

HYPER-ABRUPT JUNCTION TUNING DIODES



CASE 146
DO-14

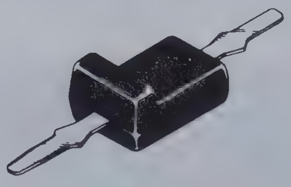


CASE 51
(DO-7)

. . .designed with a capacitance change of greater than TEN TIMES for a bias change ranging from 2 to 10 volts. Provides tuning over broad frequency ranges, tuning AM radio broadcast band, general AFC and tuning applications in lower RF frequencies.

Device Type	C_T Diode Capacitance		C_R, Capacitance Ratio		Q, Figure of Merit	Case
	V_R = 1.0 Vdc f = 1.0 MHz pF nom ± 15%	V_R = 2.0 Vdc f = 1.0 MHz pF nom ± 20%	C_1/C_{10} f = 1.0 MHz Min	C_2/C_{10} f = 1.0 MHz Min	V_R = 2.0 Vdc f = 1.0 MHz Min	
MV1401	550	–	14	–	200	146
MV1403	–	175	–	10	200	51
MV1404	–	120	–	10	200	51
MV1405	–	250	–	10	200	51

HYPER-ABRUPT JUNCTION TUNING DIODES (continued)



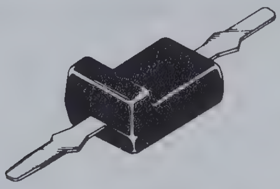
CASE 226

. . .designed in the new low-inductance mini-L package for high volume requirements of UHF and VHF TV tuning and AFC, general frequency control and tuning applications, providing solid-state reliability in replacement of mechanical tuning methods.

Device Type	C_T Diode Capacitance V_R = 3.0 Vdc, V_R = 25 V* f = 1.0 MHz pF Min/Max	C_R, Capacitance Ratio C_3/C_{25} f = 1.0 MHz Min	Q, Figure of Merit V_R = 3.0 Vdc *f = 50 MHz f = 100 MHz Min
BB105A	2.3/2.8*	4.0	225
BB105B	2.0/2.3*	4.5	225
BB105G	1.8/2.8*	4.0	150
MV3102	20/25	4.5	300*
MV3103	19/26	4.0	200*
MV3140	–/2.3*	4.5	150
MV3141	–/3.2*	4.0	150
MV3142	–/3.2*	3.5	50

PLASTIC HOT-CARRIER DIODES

CASE 166-02



CASE 226

CASE 182-01

Hot-Carrier diodes are ideal for VHF and UHF mixer and detector applications as well as many higher microwave frequency applications. They provide stable electrical characteristics by eliminating the point-contact diode presently used in many applications. Motorola has the capability of supplying these devices in a variety of packages.

		ELECTRICAL CHARACTERISTICS					
Device Type	Case	$V_{(BR)R}$ Reverse Breakdown Voltage I_R = 10 μA Volts Min	C_T Diode Capacitance V_R = 0 V, f = 1.0 MHz (1) V_R = 20 V, f = 1.0 MHz (2) pF Max	V_F Forward Voltage I_F = 10 mA Volts Max	I_R Reverse Leakage V_R = 3.0 V (3) V_R = 25 V (4) V_R = 35 V (5) μA Max	NF Noise Figure dB Max	t_{rr}(Note 1) Reverse Recovery ps Max
MBD101	182-01	4.0	1.0 (1)	0.6	0.25 (3)	7.0	–
MBD501	↓	50	1.0 (2)	1.2	0.20 (4)	–	100
MBD701		70	1.0 (2)	1.2	0.20 (5)	–	100
MBD102	226	4.0	1.0 (1)	0.6	0.25 (3)	7.0	–
MBD502	↓	50	1.0 (2)	1.2	0.20 (4)	–	100
MBD702		70	1.0 (2)	1.2	0.20 (5)	–	100
MICRO-I HOT-CARRIER DIODE							
MBI-101	166-02	4.0	1.0 (1)	0.6	0.25 (3)	7.0	–

Note 1: Krakauer method

MICRO-T TRANSISTORS AND DIODES

The Micro-T package is a tiny (0.085 inch diameter) injection-molded plastic and ceramic package for applications requiring extremely high component mounting density. Micro-T transistors and diodes are also useful in hybrid circuits—being easier to mount than unencapsulated semiconductor chips, without special equipment and special operator training.

The following tables list the major characteristics of Motorola transistors and diodes in Micro-T packages. Devices are grouped in applications categories to simplify device selection. For more detailed information, refer to the individual data sheet.

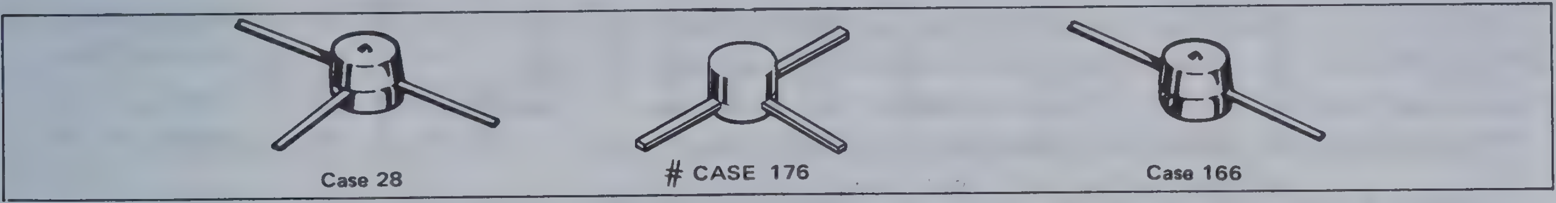


TABLE I – GENERAL-PURPOSE AMPLIFIER AND SWITCHING TRANSISTORS

Case 28 (1) # Case 176

Device Type	V_{CEO} Volts Max	Collector Test Current for Optimum h_{FE} I_C in mA	h_{FE} Min/Max	$V_{CE(sat)}$ @ I_C Volts Max	mA	f_T @ I_C MHz Min	mA	Switching Times ns(Typ) t_d	t_r	t_s	t_f	@ $I_C/I_{B1}/I_{B2}$ mA
NPN												
MMT3904	40	10	100/300	0.2	10	300	10	24	13	125	11	10/1.0/1.0
MMT3903	40	10	50/150	0.2	10	250	10	24	13	125	11	10/1.0/1.0
MMT2222	30	150	100/300	0.4	150	200	20	t_{on} = 16, t_{off} = 160				150/15/15
#MMCM2222	30	150	100/300	0.4	150	200	20	t_{on} = 16, t_{off} = 160				150/15/15
MMT76	20	10	50/400	–	–	–	–	24	13	125	11	10/1.0/1.0
PNP												
MMT2907	40	150	100/300	0.4	150	200	50	t_{on} = 20, t_{off} = 150				150/15/15
#MMCM2907	40	150	100/300	0.4	150	200	50	t_{on} = 20, t_{off} = 150				150/15/15
MMT3906	40	10	100/300	0.25	10	250	10	25	18	140	15	10/1.0/1.0
MMT3905	40	10	50/150	0.25	10	200	10	25	18	140	15	10/1.0/1.0
MMT75	20	10	50/400	–	–	–	–	25	18	140	15	10/1.0/1.0

TABLE II – HIGH SPEED SATURATED SWITCHING TRANSISTORS

Case 28 (1) # Case 176

Device Type	V_{CEO} Volts Max	Collector Test Current for Optimum h_{FE} I_C in mA	h_{FE} Min/Max	$V_{CE(sat)}$ @ I_C Volts Max	mA	f_T @ I_C MHz Min	mA	Switching Times ns (Max) t_d	t_r	t_s	t_f	@ I_C/I_B mA
NPN												
MMT2369	15	10	40/120	0.25	10	500	10	t_{on} = 12, t_{off} = 18				10/3.0
#MMCM2369	15	10	40/120	0.25	10	500	10	t_{on} = 12, t_{off} = 18				10/3.0
MMT3014	20	30	50/200	0.22	30	350	30	t_{on} = 16, t_{off} = 25				30/3.0
MMT72	10	10	30/–	0.3	10	400	10	t_{on} = 20, t_{off} = 30				10/3.0
PNP												
MMT3546	12	10	30/–	0.15	10	700	10	10	15	20	15	50/5.0
MMT73	3.0	10	30/–	0.2	10	400	10	t_{on} = 30, t_{off} = 30				10/1.0

TABLE III – HIGH-SPEED NON-SATURATED SWITCHING TRANSISTORS

Case 28 (1)

Device Type	V_{CEO} Volts Max	Collector Test Current for Optimum h_{FE} I_C in mA	h_{FE} Min/Max	$V_{CE(sat)}$ @ I_C Volts Max	mA	f_T @ I_C MHz Min	mA	Switching Times ns (Typ) t_d	t_r	t_s	t_f	@ I_C mA
NPN												
MMT3960A	8.0	10	30/200	0.2	10	1600	30	1.0	0.75	1.1	0.85	20
MMT3960	3.0	10	100/200	0.2	10	1600	30	–	0.65	–	0.75	–
MMT806	5.0	0.1	50/–	100	0.1	1200	1.0	1.0	1.5	1.0	2.0	1.0
PNP												
MMT808	5.0	0.1	50/–	100	0.1	1200	1.0	1.0	1.5	1.0	2.0	1.0

MICRO-T TRANSISTORS AND DIODES (continued)

TABLE IV – LOW NOISE AMPLIFIER TRANSISTORS

Case 28 (1) # Case 176

Device Type	V_{CEO} Volts Max	Collector Test Current for Optimum h_{FE} I_C in mA	h_{FE} Min/Max	f_T @ MHz Min	I_C µA	NF @ dB Max	I_C µA	and f MHz
NPN								
MMT2484	60	1.0	250/–	60	500	3.0	10	10 Hz to 10 kHz
#MMCM2484	60	1.0	250/–	60	500	3.0	–	10 Hz to 10 kHz
MMT930	45	1.0	150/–	60	500	–	–	–
#MMCM930	45	1.0	150/–	60	500	–	–	–
MMT70	20	2.0	150/–	–	–	1.0*	10	10 Hz to 15.7 kHz
PNP								
MMT3799	60	0.1	300/900	40	500	2.5	100	10 Hz to 15.7 kHz
MMT3798	60	0.1	150/450	40	500	3.5	100	10 Hz to 15.7 kHz
MMT71	20	2.0	150/–	–	–	1.5*	100	–

*Typical

TABLE V – RF AMPLIFIER AND OSCILLATOR TRANSISTORS

Case 28 (1)

Device	f_T MHz Min	f_T MHz Typ	NF @ dB Max* Typ	f MHz	Gpe @ dB Typ	f MHz
NPN						
MMT918	600	–	6.0*	60	23	200
MMT74	700	1000	4.0	450	14	450
MMT8015	1000	2000	3.2	1000	13	1000
MMT2857	1000	1300	3.8	450	18	450
MMT807	1200	2100	2.0	200	23	200
PNP						
MMT4261	2000	–	–	–	–	–
MMT809	1200	2500	2.6	200	23	200

TABLE VI – N-CHANNEL JUNCTION FIELD-EFFECT TRANSISTORS

FOR RF AND MIXER APPLICATIONS
Case 28(5)

Device Type	$V_{(BR)GSS}$ Volts Min	I_{DSS} mA Min/Max	C_{iss} pF Typ	$Re(y_{is})$ µmhos Typ	NF @ Typ dB	f MHz
MMT3823	-30	5.0/20	4.0	500	2.0	100

TABLE VII – SWITCHING DIODES

Device Type	$V_{(BR)}$ @ Volts Min	$I_{(BR)}$ µA	I_R @ µA Max	V_R Volts	V_F @ Volts Min/Max	I_F mA	$CeV_R = 0$ pF Max	t_{rr} ns Max	Case	Description
MMD70	50	100	0.1	30	0.75/1.2	100	2.5	15	166	Single
MMD6050	70	100	0.1	50	0.55/0.7	1.0	2.0	5.0	166	Single
MMD6100	70	100	0.1	50	0.55/0.7	1.0	2.0	5.0	28 (2)	Common-Cathode
MMD6150	70	100	0.1	50	0.55/0.7	1.0	2.0	5.0	28 (3)	Common-Anode
MMD7000	70	100	0.1	50	0.55/0.7	1.0	2.0	5.0	28 (4)	Series
MMD7001	45	10	0.1	30	–/1.05	300	3.5	3.2*	28 (4)	Series

*Typical

OPTOELECTRONICS

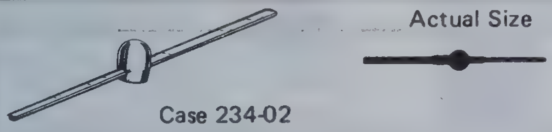
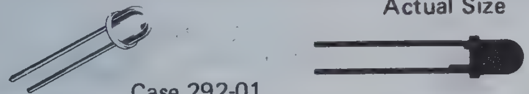
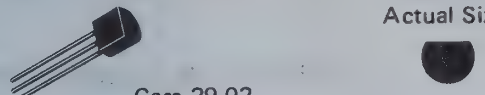
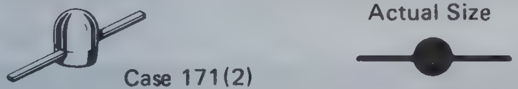
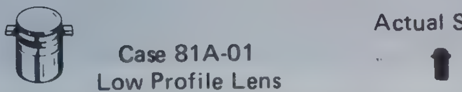
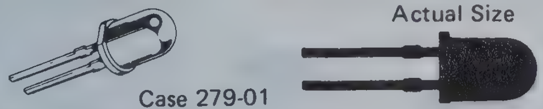
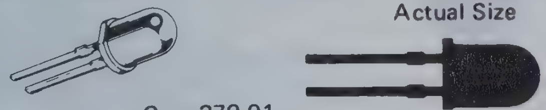
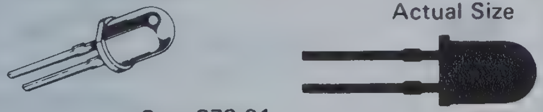
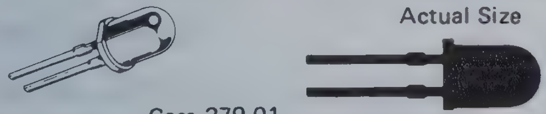
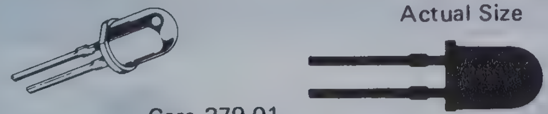
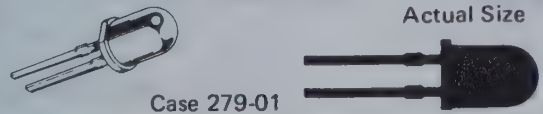
Optoelectronic devices are designed for use in computer, industrial and consumer equipment. Motorola's standard line of optoelectronic products include optical couplers, light emitters and light detectors. Also available from Motorola are custom phototransistor and light emitting diode (LED) arrays using discrete devices mounted on printed circuit boards. Compactness, reliability and compatibility with integrated circuits keynote light emitting diode advantages — as well as perfect spectral matching of infrared (I_R) units to silicon detectors. They emit infrared or visible light when forward biased. Motorola offers a variety of red and infrared, fast switching types for flexibility in package, performance and price.

LIGHT-EMITTING DIODES

Light-emitting diodes offer several advantages over incandescent and gas-filled lamps in many applications, e.g., long lifetime, IC compatibility, ruggedness, and frequency response into the VHF region. A variety of plastic and hermetically sealed packages offer choices of viewing angle, type of lens, and size.

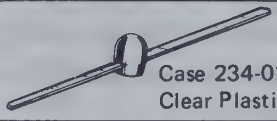
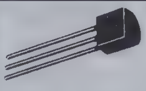
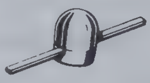
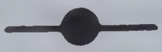
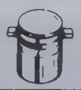
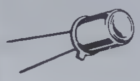
VISIBLE LIGHT EMITTING DIODES

Motorola visible emitters are available for use in panel and circuit condition indicators, light modulators, alphanumeric displays and film annotation.

Package	Type No. (Lens Type)	Peak Emission Wavelength Typ nM	Brightness Typ fL	Forward Voltage Typ Volts @ 20 mA	Instantaneous Axial Luminous Intensity Typ mcd
 Actual Size Case 234-02	MLED50 (Clear) MLED55 (Diffusing Red)	660	– –	1.6 –	1.0 @ 20 mA 0.6 @ 20 mA
 Actual Size Case 292-01	MLED455 (Diffusing Red)	660	–	1.6	1.2 @ 20 mA
 Actual Size Case 29-02	MLED500 (Diffusing Red)	660	–	1.6	0.3 @ 20 mA
 Actual Size Case 171(2)	MLED600 (Clear Red)	660	1100 @ 50 mA	1.6	–
 Actual Size Case 81A-01 Low Profile Lens	MLED610 (Clear)	660	1100 @ 50 mA	1.6	–
 Actual Size Case 279-01	MLED640 (Milky White)	660	–	1.6	2.0 @ 20 mA
 Actual Size Case 279-01	MLED650 (Diffusing Red) Wide Viewing	660	–	1.6	0.8 @ 20 mA
 Actual Size Case 279-01	MLED655 (Diffusing Red) General Purpose	660	–	1.6	2.0 @ 20 mA
 Actual Size Case 279-01	MLED660 (Diffusing Red) High Contrast	660	–	1.6	1.5 @ 20 mA
 Actual Size Case 279-01	MLED665 (Diffusing Red) High Intensity	660	–	1.6	3.0 @ 10 mA
 Actual Size Case 279-01	MLED750 (Diffusing Green)	560	–	2.0	2.0 @ 50 mA

INFRARED EMITTING DIODES

Infrared (900 nM) gallium arsenide emitters are available from Motorola for use in light modulators, shaft or position encoders, punched card and tape readers, optical switching and logic circuits. They are spectrally matched for use with silicon detectors.

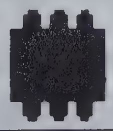
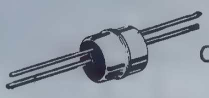
Package	Type Number	Peak Emission Wavelength Typ nM	Instantaneous Power Output Typ µW	Forward Voltage Typ Volts @ 50 mA
 Actual Size Case 234-02 Clear Plastic	MLED60	900	550 @ 50 mA	1.2
	MLED90	900	350 @ 50 mA	1.2
 Actual Size Case 29-02	MLED92	900	350 @ 50 mA	1.2
 Actual Size  Case 171(2)	MLED900	900	550 @ 50 mA	1.2
 Actual Size Case 81A-01 Low Profile Lens	MLED910	900	150 @ 50 mA	1.2
 Actual Size Case 209-01	MLED930	900	650 @ 100 mA	1.2

OPTICAL COUPLERS/ISOLATORS

Optoelectronic couplers consist of an infrared light-emitting diode optically coupled to a silicon photodetector. Available detector outputs are transistors, darlingtons, or SCRs. Couplers are used in systems where the transmission of signals from input to output is desired without any electrical connection. Typical applications are as interface circuits between low level logic and high power systems, motor speed controls, solid state relays, telephone systems, point-of-sale terminals, and other computer peripheral systems. They offer advantages of high isolation voltage and impedance, small size, IC compatability, and solid state reliability.

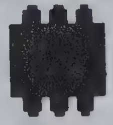
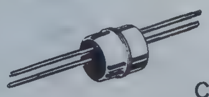
TRANSISTOR OUTPUT

Couplers with transistor detectors/outputs are general purpose devices used where moderate outputs of 1-10 mA and speeds of 2-5 μs are required.

Package	Type Number	Collector Output Current Typ mA	@ Input mA I_F	Isolation Voltage Min
Case 673-03  Actual Size	4N25 (MOC1001)	5.0	10	2500
	4N26 (MOC1000)	5.0	10	1500
	4N27 (MOC1002)	3.0	10	1500
	4N28 (MOC1003)	3.0	10	500
 Case 271-01 Actual Size	MOC2000	1.5	15	1000

DARLINGTON OUTPUT

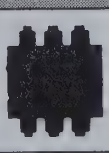
Couplers with Darlington detectors/outputs are useful in applications where high sensitivity or high output currents of 20-50 mA are required.

Package	Type Number	Collector Output Current Typ mA	@ Input mA I_F	Isolation Voltage Min
Case 673-03  Actual Size	4N29	30	10	2500
	4N30 (MOC1200)	30	10	1500
	4N31	10	10	1500
	4N32	60	10	2500
	4N33	60	10	1500
	4N34	60	16	1500
 Case 271-01 Actual Size	*MOC2200	3.0	15	1000

*Available soon.

SCR OUTPUT

Couplers with SCR detectors/outputs are useful in applications requiring AC compatible outputs.

Package	Type Number	Turn-On Sensitivity I_F Typ mA	Peak Forward Blocking Voltage Min	Isolation Voltage Min
Case 673-03  Actual Size	*MOC1300	10	200	2500
	*MOC1301	10	400	2500

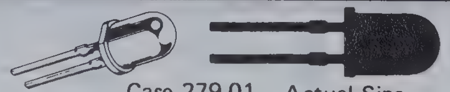
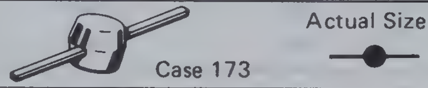
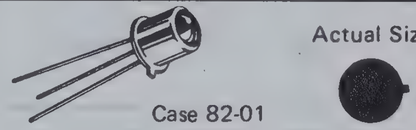
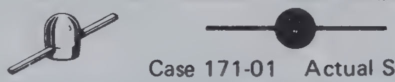
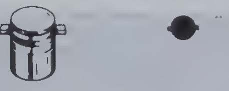
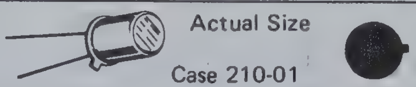
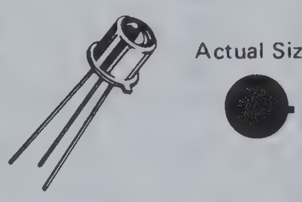
*Available soon.

NPN SILICON PHOTODETECTORS

A variety of silicon photodetectors are available for a wide range of light detecting applications. Devices are available in packages offering choices of viewing angle and size in either low cost, economical, plastic cases or rugged, hermetic, metal cans. Advantages over phototubes are high sensitivity, good temperature stability, and proven silicon reliability. Applications include card and tape readers, pattern and character recognition, shaft encoders, position sensors, counters, and others. Maximum sensitivity occurs at approximately 800 nM.

PHOTO DETECTORS – TRANSISTORS

Phototransistors are used where moderate sensitivity and medium speed (2.0 μs) are required.

Package	Type Number	Light Current Typ mA	@ H mW/cm^2	BV$_{CEO}$ Volts Min	Dark Current nA Max	@ Volts
 Case 279-01 Actual Size	*MRD120 *MRD120A	2.4 3.0	1.0 1.0	20 20	100 100	5.0 5.0
 Actual Size Case 173	MRD150	0.5	5.0	40	100	20
 Actual Size Case 82-01	MRD300 MRD310	7.5 2.5	5.0 5.0	50 50	25 25	20 20
 Case 171-01 Actual Size	MRD450	4.0	5.0	40	100	20
 Actual Size Case 81A-01	MRD601 MRD602 MRD603 MRD604	1.5 3.5 6.0 8.5	20 20 20 20	50 50 50 50	25 25 25 25	30 30 30 30
 Actual Size Case 210-01	MRD810	4.0	5.0	35	50	20
 Actual Size Case 82-01	MRD3050 MRD3051 MRD3052 MRD3053 MRD3054 MRD3055 MRD3056	0.2 0.2 0.25 0.5 1.2 1.8 2.5	5.0 5.0 5.0 5.0 5.0 5.0 5.0	30 30 30 30 30 30 30	100 100 100 100 100 100 100	20 20 20 20 20 20 20

*Available soon.

OPTOELECTRONICS (continued)

NPN SILICON PHOTODETECTORS

(continued)

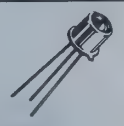
PHOTO DETECTORS – DIODES

Photodiodes are used where high speed is required (1.0 ns).

Package	Type Number	Light Current		BV_R Volts Min	Dark Current	
		Typ µA	@ H mW/cm²		nA Max	@ Volts
Actual Size Case 209-01	MRD500	9.0	5.0	100	2.0	20
Actual Size Case 210-01	MRD510	2.0	5.0	100	2.0	20

PHOTO DETECTORS – DARLINGTON

Photodarlingtons are used where maximum sensitivity is required with typical rise and fall times of 50 µs.

Package	Type Number	Light Current		BV_{CEO} Volts Min	Dark Current	
		Typ mA	@ H mW/cm²		nA Max	@ Volts
Actual Size Case 29-01	MRD14B	2.0	2.0	12	100	12
	2N5777	4.0	2.0	25	100	12
	2N5778	4.0	2.0	40	100	12
	2N5779	8.0	2.0	25	100	12
	2N5780	8.0	2.0	40	100	12
 Actual Size Case 82-01	*MRD360	20	0.5	40	100	10
	*MRD370	10	0.5	40	100	10

*Available soon.

Chips

Motorola has made available to the hybrid circuit manufacturer, in chip form, virtually all of the thousands of discrete and integrated circuit devices in its standard product catalog. More detailed information on these chips, including testing, visual inspection, packaging, size, geometry and metallization is presented in Motorola's new Semiconductor Chips Data Book.

The Discrete Selection Guide section includes only those chips which are available as "off-the-shelf" products. Specific selection guides cover small-signal transistors, field-effect transistor, RF transistors, silicon power transistors, zener diodes, and discrete resistor chips. For information on Digital, Linear integrated circuit chips and McMOS chips see section 7 of this volume.

INTRODUCTION

The increasing complexity of today's electronic systems is accompanied by paralleling demands for increased component density, improved subsystem reliability and reduced functional costs. This triple requirement is leading to widespread adaptation of hybrid technologies and consequently, to a rapidly expanding demand for unencapsulated semiconductor components.

Motorola is responding to this demand by making available, in chip form, virtually all of the thousands of discrete and integrated circuit devices in its standard-product catalog. However, the purchase of chips is not always as clear-cut and routine as the purchase of standard packaged devices. Variations in shipping requirements, factory testing and guarantees, as well as delay times involved in the shipment of low-volume production items complicate the vendor/buyer communications interface. Hence, Motorola has developed a system of chip categories intended to reduce earlier complications.

Most important of these categories is an inventory of product chips that are manufactured and stocked just like their fully encapsulated counterparts. This "stock" chip line encompasses the more popular products from most of Motorola's product categories. All other products, though available, must be purchased on special order through individual negotiations.

In addition to these derivatives from standard production lines, Motorola manufactures special-process devices, e.g., beam-lead and flip-chip components, that are not necessarily available in encapsulated form. These devices, designed specifically for the manufacture of hybrid circuits, help to establish Motorola as a major supplier to the hybrid market.

This Chips Data Book is designed to acquaint the hybrid manufacturer not only with the most important products being offered by Motorola in chip form, but also with testing and shipping variations that are available. It does not cover every device that is being manufactured, but represents an authoritative first-evaluation selector guide to chip availability and use.

For complete characterization of the many thousands of components available in chip form, it would be necessary to consult the Motorola Semiconductor Data Library plus all the individual Motorola Data Books covering specific integrated circuit lines. To reduce the complexity of making suitable device selections, this book contains a compilation of available chips representing a cross-section of each major product category. The devices characterized herein include the most popular components covering the total performance spectrum of each product category. The selection consists of units from high volume production runs that insure long-term availability, early delivery and lowest cost.

GENERAL INFORMATION

CHIP AVAILABILITY

Motorola unencapsulated devices encompass three levels of availability: stock, standard and special. They are tested to the same rigid in-process controls of reliability and performance as packaged devices.

Stock Availability applies to chips that have been fully tested to a specified and guaranteed set of parameters. These chips are packaged in a variety of shipping carriers and are stocked for off-the-shelf delivery at the factory and at Motorola distributors. Stock chips have their own specific device type numbers and are listed in the Motorola price lists. For applications within the performance capabilities of stock chips, such units merit first consideration on the basis of off-the-shelf delivery and lowest cost. (See table 1.)

Standard Availability applies to all chips (other than stock chips) that are produced on Motorola assembly lines for encapsulated standard product. Such chips are not stocked in chip form and, therefore, are not available for off-the-shelf delivery. Nevertheless, delivery capability is good, particularly for chips coming off high-volume production lines running at a continuous rate. Price and delivery quotations can be obtained from your nearest Motorola sales representative. (See table 1.)

Table 1 — Availability of STOCK and STANDARD Chips by Product Lines

Product Line	Conventional Chip		Beam-Lead Chips	Flip-Chips
	Stock	Standard	Stock	Stock
Linear IC	MCC prefix Op Amps, Voltage Regulators, Comparators, Multipliers	All Linear ICs	MCBC Prefix Op Amps, Regulators, Multipliers, Comparators	MMCF Prefix Op Amps.
Digital Bipolar IC		All MTTL, MRTL, MDTL, MECL Logic Elements	MCBC Prefix, MTTL 5400 Series Functions	
McMOS IC	MCC14000/14500 Series of Complementary MOS Logic			
Silicon Power Transistors	MJC prefix; complementary chips for currents to 25 Amps and voltage to 60 Volts	All silicon power devices including Darlington		
Small-Signal Transistors, FETs, Switching Diodes	MMCS Prefix — broad selection of devices	Nearly all chips from Motorola's metal can, plastic, FET, signal diode product families		MMCF Prefix, Small-Signal Transistors and Diodes
RF Transistors	MMCS Prefix; popular small-signal devices	Most small-signal devices		
Thyristors, Triggers, and Rectifiers		Most signal thyristors, Unijunctions and Triggers Selected power thyristors and rectifiers		
Zener Diodes	MZC Prefix; from 1.8 – 200 Volts	Nearly all Zener Diodes and Current Regulators		
Passive Components	MMCR100 Multi-tap resistor MMCQ100 capacitors from 33 pF to 220 pF MMCQ101 Multi-tap binary capacitor, 1.0 pF to 31 pF	MMCRA Series Resistor chips from 0.1 Ohm – 5.1 M Ohm		

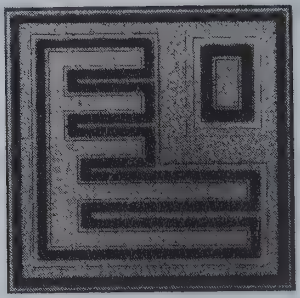
Special Availability refers to chips with special parameter selections or special processing of standard Motorola product. Except for devices requiring special parameter selection from high-volume production lines, delivery should normally be planned far in advance. Moreover, Motorola maintains the right to refuse orders for special devices where the production of such devices would adversely affect the production of standard products. Special devices, therefore, should be considered only if stock or standard devices cannot be adapted to a specific application — and then only if the quantity requirements are relatively large. Orders for special devices can be negotiated through your Motorola sales representative.

Chip Structures(1)

To facilitate the development of hybrid circuits, Motorola offers three different chip structures, permitting three different mounting methods: conventional (face-up) mounting, beam-lead mounting, and flip-chip mounting. Not all devices are offered in all three options, however. The information in Table I provides a quick overview of the kinds of discrete and integrated circuit components generally available in the various structures.

Chips for *conventional mounting* comprise the total assortment of semiconductor chips manufactured by Motorola for encapsulation in standard packages. Such chips are gold-plated on the bottom to provide a good eutectic bond with metallized areas of a hybrid circuit substrate. Connections to the device or circuit elements are made with conventional wire bonding techniques to bonding pads on the top face of the chip. Normally, conventional Motorola chips utilize aluminum for on-chip interconnecting and bonding pad metallization. Wire of either aluminum or gold may be used for connection between on-chip bonding pads and the external circuit.

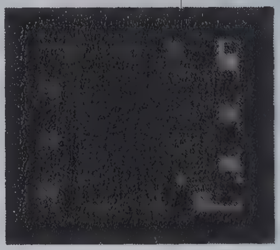
Conventional Chip



Beam-Lead Chips are designed specifically for hybrid circuit manufacture. Their distinguishing feature is a set of on-chip cantilevered beams used to interconnect the chip circuit element with the substrate circuit bonding pads. In production, a complex integrated circuit chip with a large number of interconnecting beams can be wired to the substrate, forming all necessary interconnections in a single operation using wobble-bonding techniques. In addition, the entire surface of a beam-lead chip, except the beams, is covered with a passivating layer of silicon nitride that is as effective as a hermetically sealed package in protecting the circuit against contamination.

Initially, beam-lead devices were designed primarily for high-reliability applications. In certain applications, however, they can also offer a cost advantage due to the reduced labor cost associated with wiring such devices into a hybrid circuit.

Beam-Lead Chips



Flip-Chips, like beam-lead chips, can be mounted to a hybrid substrate in a single operation.

In the case of flip-chips, connection to the substrate bonding pads is made by means of raised "solder bumps" that protrude above the chip surface at the device or integrated-circuit bonding pads. The devices are mounted to the substrate metallization areas circuit side down, by means of conventional solder reflow techniques.

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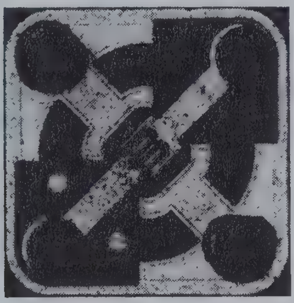
(1) Semiconductor chips are offered as basic components for the manufacture of hybrid circuits. Motorola also manufactures a wide range of discrete components in micro-miniature packages. Such packages, called micro-T, micro-H, and micro-L, are also suitable for use in hybrid circuits. Details for such packaged devices can be found in the Motorola Semiconductor Data Library, Volume II and the Reference Volume.

Motorola flip-chips are designed for automatic handling and low cost assembly. All transistor and diode chips are 0.030" square, regardless of the actual size of the active area, and all solder bumps are uniformly spaced near the corners of the chip. Flip-chip surfaces are protected by glass passivation.

Flip-Chips



Device Selection Data

The information presented in the subsequent product sections of this data book is compiled from individual product data sheets and from data contained in the Motorola Semiconductor Data Library. The selection tables are arranged to highlight the device characteristics most often needed for a first evaluation and preselection. And provided, as an aid to hybrid-circuit design engineers, are chip size, geometry and metallization.[2]

Chip Size. Each product section contains accurate data of chip periphery. Chip thickness is given only for those chips that depart from the norm, e.g., flip-chips. Conventional chips normally range from 5 mils (min) to 7 mils (max) for small signal devices, and from 7 mils (min) to 9 mils (max) for integrated circuits. Where chips are purchased from the same wafer, normal variation in thickness is less than 0.5 mils.

Chip Geometry. The geometry or front metallization pattern of each chip is illustrated by a sketch taken from the actual metallization mask. Each sketch clearly indicates the bonding pads by function, emitter, base, drain, etc., to assist the designer in formulating hybrid-circuit substrate design.

Metallization. Each product line section of this book includes information regarding the metallization material used for both front and back faces of the chips and recommends specific die-and wire-bonding techniques.

Ordering Options for Standard Chips

For "standard" Motorola chips, the customer has the option of purchasing devices at various points during the conventional process cycle, which influences the device costs. These points, together with a brief overview of the tests and product characteristics at each point, are given in the flow-chart on pages 6-6 and 6-7.

The first order option, for example, occurs after "class probe," while the devices are still on the unscribed wafer. The class probe identifies the major dc parameters of the chips on the wafer on a sample basis, thereby permitting classification of the chips as to their specific device type numbers. As indicated, the chips are shipped in wafer form and must be scribed and broken by the user.

Subsequent order options permit the customer to order chips at more advanced processing and testing points. The chips become progressively more expensive, but require less work on the part of the user and guarantee a higher level of yield to tighter specifications.

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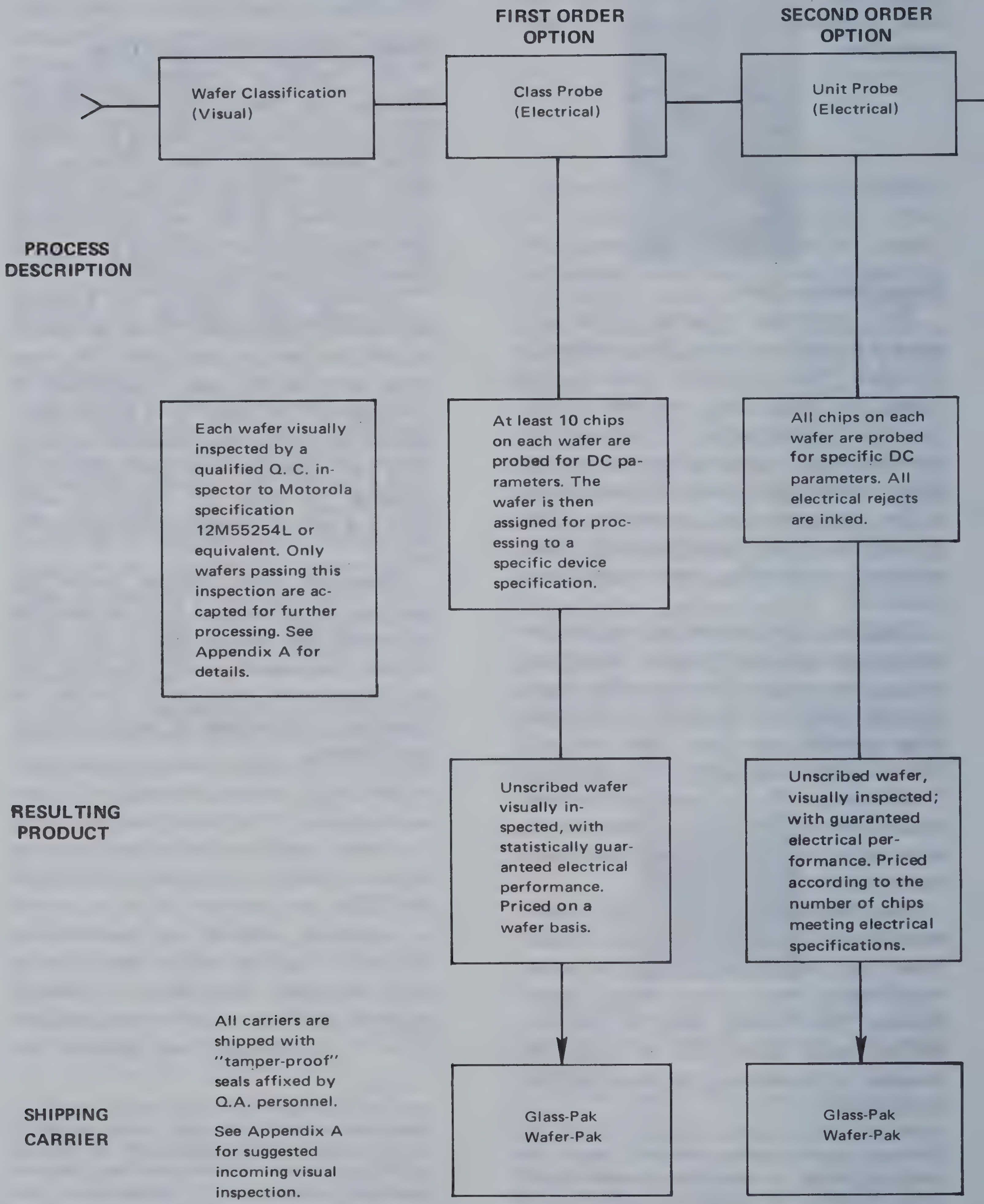
[2] Future improvements in device design may result in changes in the physical characteristics of chips. All chip sizes and geometries shown in this book are accurate at the time of publication and every effort will be made to advise Motorola chip users of design changes prior to shipment of devices.

CHIP PROCESSING FLOW CHART


FIRST ORDER OPTION
SECOND ORDER OPTION
Wafer Classification (Visual)
Class Probe (Electrical)
Unit Probe (Electrical)
PROCESS DESCRIPTION
RESULTING PRODUCT
SHIPPING CARRIER
Glass-Pak
Wafer-Pak
Glass-Pak
Wafer-Pak

Each wafer visually inspected by a qualified Q. C. inspector to Motorola specification 12M55254L or equivalent. Only wafers passing this inspection are accapted for further processing. See Appendix A for details.

At least 10 chips on each wafer are probed for DC parameters. The wafer is then assigned for processing to a specific device specification.

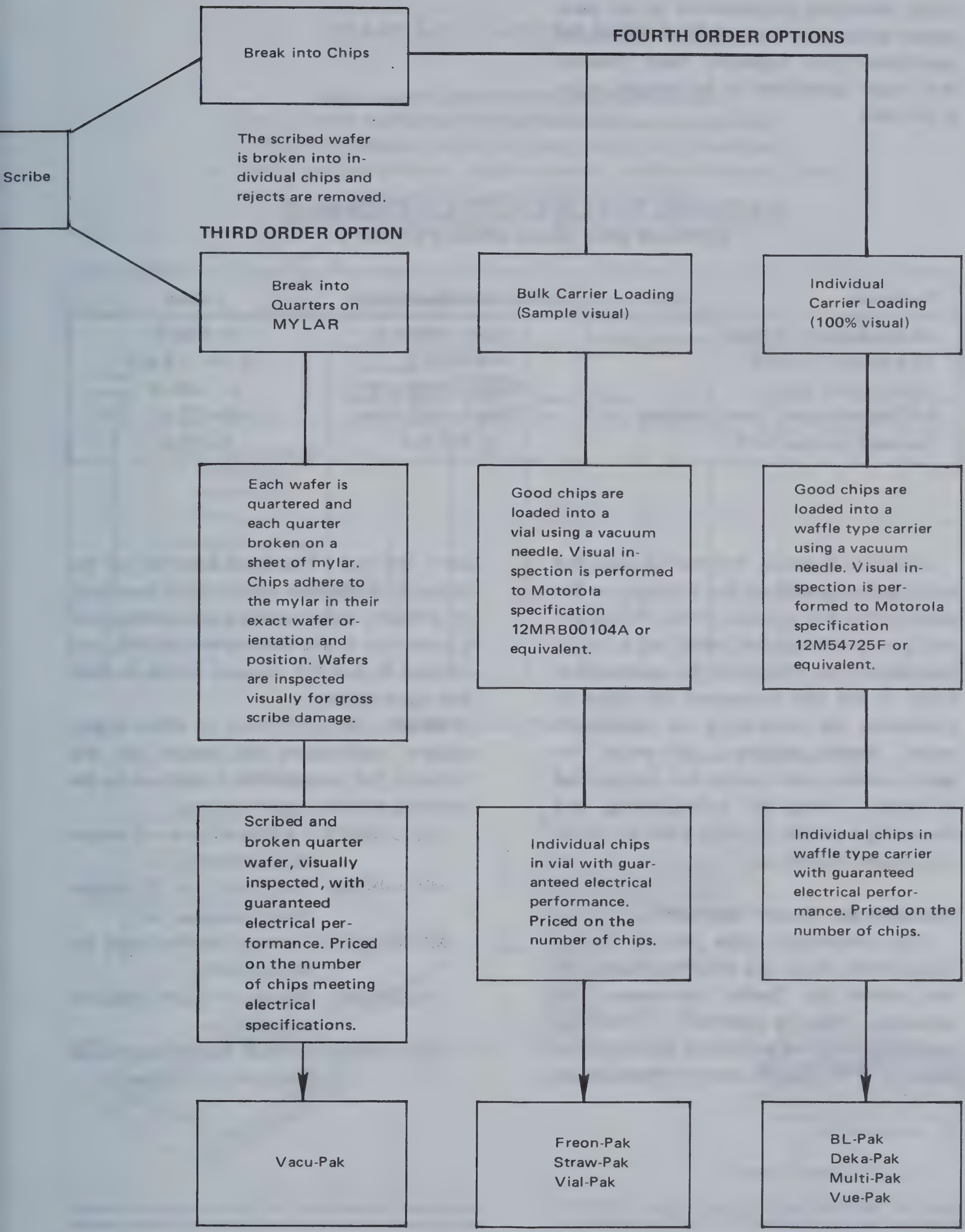
All chips on each wafer are probed for specific DC parameters. All electrical rejects are inked.

Unscribed wafer visually inspected, with statistically guaranteed electrical performance. Priced on a wafer basis.

Unscribed wafer, visually inspected; with guaranteed electrical performance. Priced according to the number of chips meeting electrical specifications.

All carriers are shipped with "tamper-proof" seals affixed by Q.A. personnel.

See Appendix A for suggested incoming visual inspection.



Scribe

Break into Chips

The scribed wafer is broken into individual chips and rejects are removed.

FOURTH ORDER OPTIONS

THIRD ORDER OPTION

Break into Quarters on MYLAR

Each wafer is quartered and each quarter broken on a sheet of mylar. Chips adhere to the mylar in their exact wafer orientation and position. Wafers are inspected visually for gross scribe damage.

Scribed and broken quarter wafer, visually inspected, with guaranteed electrical performance. Priced on the number of chips meeting electrical specifications.

Vacu-Pak

Bulk Carrier Loading (Sample visual)

Good chips are loaded into a vial using a vacuum needle. Visual inspection is performed to Motorola specification 12MRB00104A or equivalent.

Individual chips in vial with guaranteed electrical performance. Priced on the number of chips.

Freon-Pak
Straw-Pak
Vial-Pak

Individual Carrier Loading (100% visual)

Good chips are loaded into a waffle type carrier using a vacuum needle. Visual inspection is performed to Motorola specification 12M54725F or equivalent.

Individual chips in waffle type carrier with guaranteed electrical performance. Priced on the number of chips.

BL-Pak
Deka-Pak
Multi-Pak
Vue-Pak

Probe Capability

Individual chips are tested to the conventional data-sheet specifications for dc parameters within the limitations of chip probe capabilities. The following table presents unit probe capabilities of equipment in use at this time.

ELECTRICAL TEST CAPABILITY FOR PROBING OF BIPOLAR AND DIODE DISCRETE CHIPS

Parameter	Test Condition Limits	Limits
All Breakdown Voltages	10 μA–150 mA	0–500 V
All Leakage Currents	0–500 V	10 nA–1.5 mA
Current Gain (h_{FE})	100 μA–500 mA	0–1000 V
All Saturation and "on" Voltages	100 μA–500 mA	0–10 V
Forward Voltage (V_F)	0–150 mA	0–25 V

During unit probe, the desired tests and limits are programmed and all chips on the entire wafer are probed. Chips failing any test are automatically inked as a reject. Parameters that are outside the accuracies or limits of the test equipment can often be guaranteed by correlating to measurable values. Where necessary, on orders for special devices only, a wafer can be qualified to certain limits by encapsulating and measuring a sample of chips from the wafer on standard test set-ups.

Reliability and Quality Assurance

Chip Processing steps include several independent visual and electrical checks on the product by Quality Assurance (QA) personnel. Prior to shipment, a final QA examination of the product is preformed to insure that all requirements of the purchase order are met. The total function of the Motorola Reliability and Quality Assurance (R and QA) organization is quite broad and is presented in the Semiconductor Products Division R and QA Manual, which is available upon requests.

Chips used in military or other highly reliable applications are tested by the Motorola QA personnel and conform to the following military specifications:

MIL-C-45662	Calibration System Requirements
MIL-I-45208	Inspection System Requirements
MIL-M-38510	General Specifications for Microcircuits
MIL-Q-9858	Quality Program Requirements
MIL-S-19500	General Specifications for Semiconductor Devices

STANDARD CARRIER PACKAGES

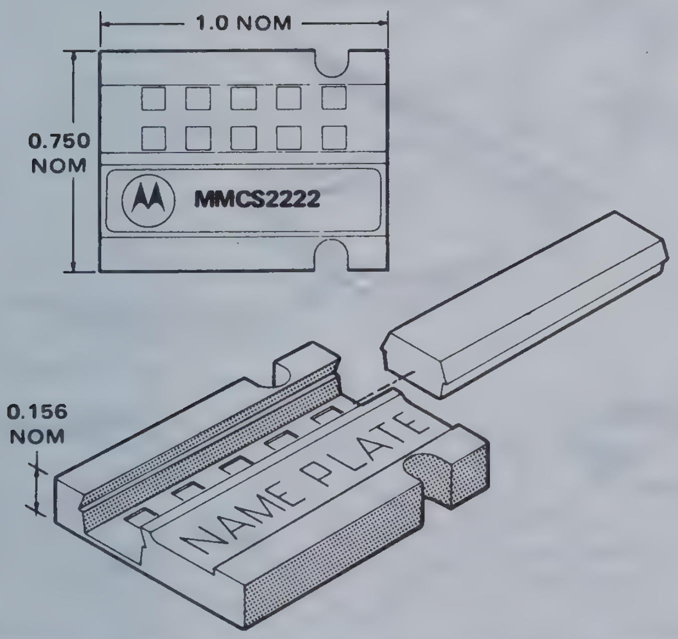
Motorola supplies chips in a variety of standard packages to accomodate customers with both large and small quantity requirements. All carrier packages are shipped with "tamper-proof" seals to ensure that only qualified personnel will handle chips and to provide proper protection during transit. The following Table lists by chip structure and product category, the carrier package options available for wafers and chips.

STANDARD CARRIER PACKAGE OPTIONS

CHIP STRUCTURE	PRODUCT	WAFERS			CHIPS (Individual)				CHIPS (Bulk)		
		Unscribed		Scribed & Broken							
		Glass-Pak	Wafer-Pak	Vacu-Pak	Deka-Pak	Multi-Pak	Vue-Pak	BL-Pack	Vial	Freon-Pak	Straw-Pak
Conventional	Discrete Semiconductors	X	X	X	X	X			X	X	X
	Passive Devices	X			X	X			X	X	X
	Integrated Circuits		X				X				
Flip-Chips	Discrete Semiconductors					X					X
	Integrated Circuits						X				
Beam-Lead Chips	Discrete Semiconductors							X			
	Integrated Circuits							X			

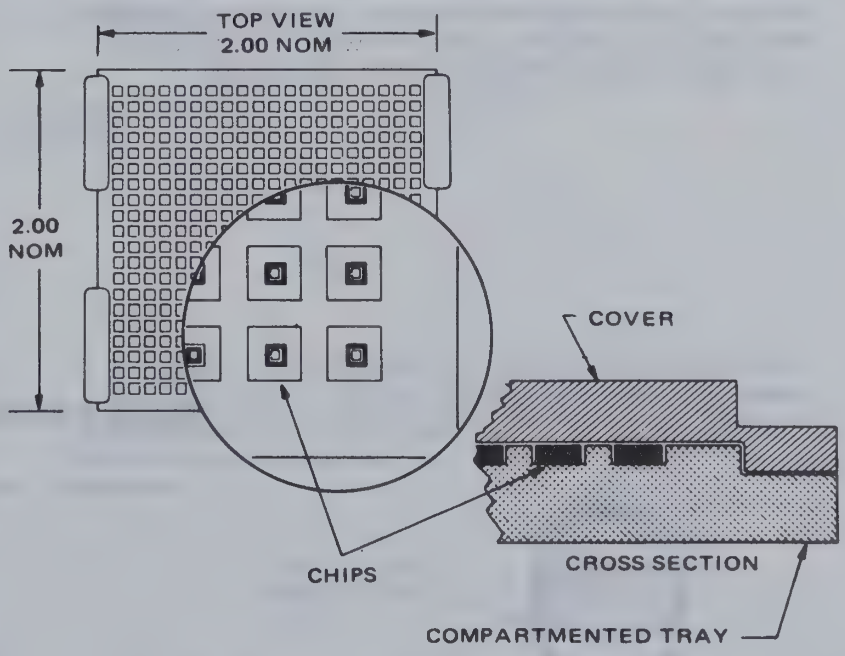
INDIVIDUAL PACKAGING

FIGURE 1 – DEKA-PAK▲
(10-chip carrier)



To accommodate the customer with limited quantity requirements, the Deka-Pak carrier contains individual compartments for 10 chips.

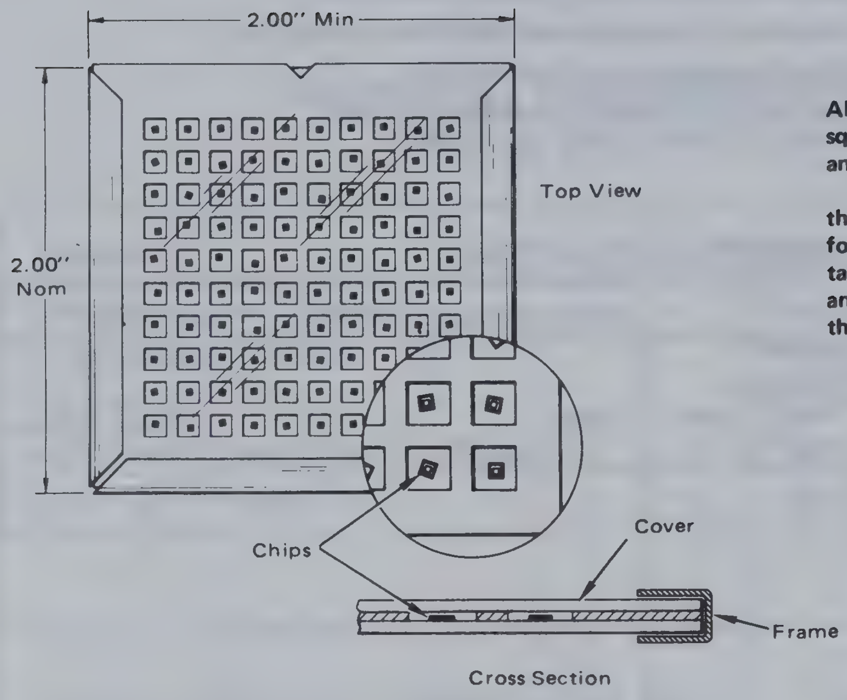
FIGURE 2 – MULTI-PAK▲



The Multi-Pak carrier is designed for production use. Two versions are available, one holding 400 small chips, and one holding 100 large chips, such as those used for power transistors. All carriers are 2-inch squares.

▲Trademark of Motorola Inc.

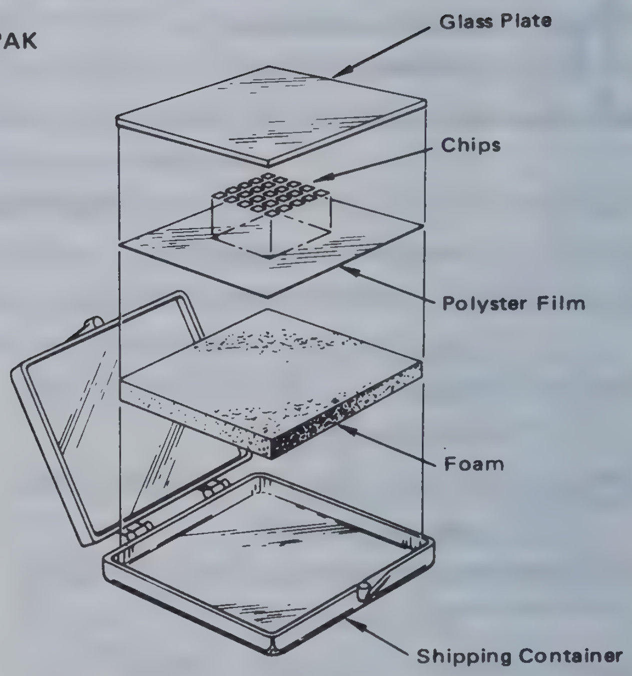
FIGURE 3 – VUE PAK▲
INTEGRATED CIRCUIT CHIP CARRIER


2.00″ Min
2.00″ Nom
Top View
Chips
Cover
Frame
Cross Section

All Motorola integrated circuit chips are packaged in a 2-inch square carrier as shown in Figure 3. This carrier is protected with an anti-static coating.

Each chip is placed in its compartment, geometry side up, so that incoming visual inspection of both chip surfaces may be performed prior to breaking the carrier seal. In addition, the container permits the customer to remove only a portion of the devices and the carrier can be resealed and used as a storage container for the unused chip.

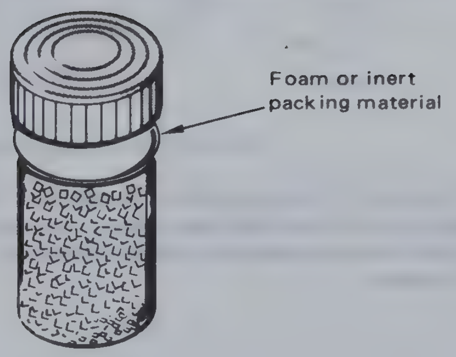
FIGURE 4 – BL-PAK


Glass Plate
Chips
Polyster Film
Foam
Shipping Container

The shipping carrier for beam-lead chips is a 2″ square glass plate on which the chips are placed with the beams flat against the glass. A thin layer of polymer film covers the plate and retains the placement of chips. The chips do not adhere to the film when it is lifted to remove them from the carrier. Care must be exercised when removing the chips from the carrier to ensure that the beams are not bent. A vacuum pickup is useful for this purpose.

BULK PACKAGING

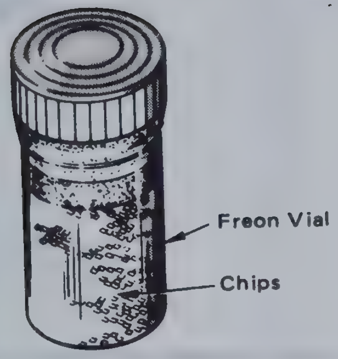
FIGURE 5 – VIAL-PAK


Foam or inert packing material

The vial-pak is designed for the large quantity user. Chips are held in position with foam or inert packing material.

FIGURE 6 – FREON VIAL

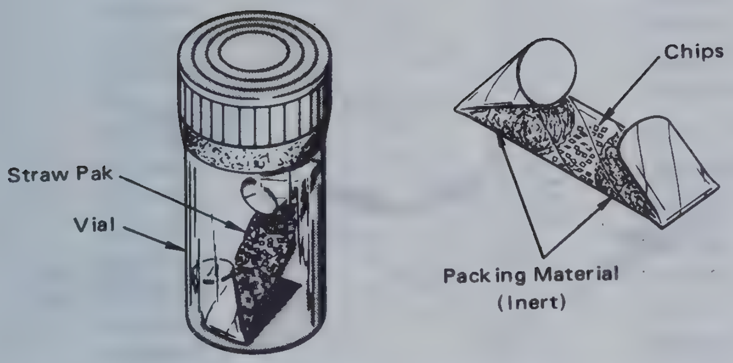
Bulk-Pak (5000 Chip Maximum)


Freon Vial
Chips

Chips are protected from damage by being immersed in Freon R TF.
Freon TF (Trichlorotrifluoroethane) is non-flammable, non-explosive, exceptionally pure, chemically stable and low in toxicity. Freon TF leaves a residue-free surface when parts are dried at room temperature. To remove the chips pour the Freon TF through a piece of filter paper into a beaker or waste can. Chips will dry rapidly when left at room temperature.

® Freon is Registered Trademark of E.I. DuPont, DeNemours & Co., Inc.

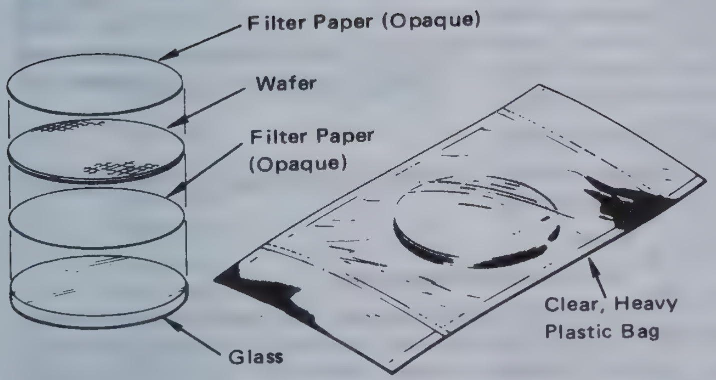
FIGURE 7 — STRAW-PAK


Chips
Straw Pak
Vial
Packing Material
(Inert)

The chips are contained in a section of straw which is placed in a plastic vial. Packing material as indicated prevents movement of the chips and keeps the chips from being crushed by the top bend of the straw during packaging and subsequent opening and closing for inspection and use.

WAFER PACKAGING

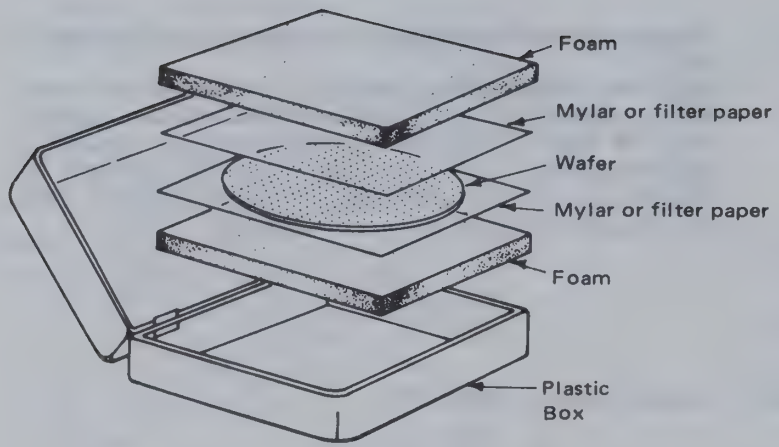
FIGURE 8 – GLASS-PAK
(Wafer – Unscribed)


Filter Paper (Opaque)
Wafer
Filter Paper
(Opaque)
Glass
Clear, Heavy
Plastic Bag

The unscribed wafer is held between two pieces of filter paper and is protected from breakage by the thick glass plate. The wafer and the glass plate are held together firmly in the evacuated and thermally sealed plastic bag.

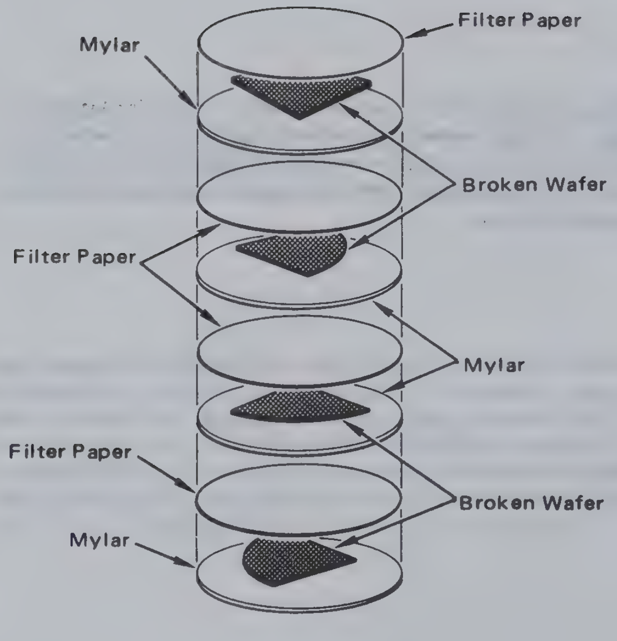
(See Page 6-12 for handling precautions.)

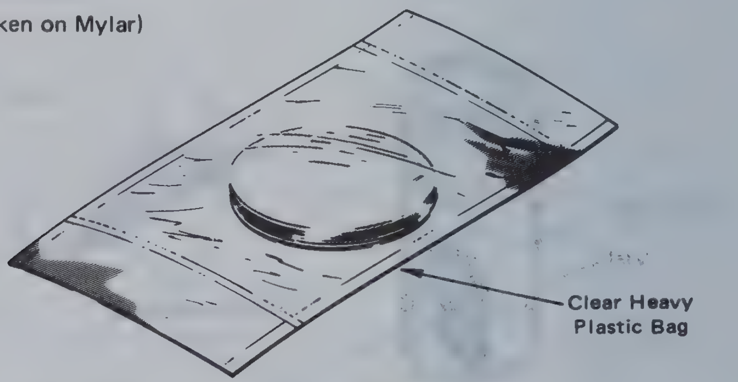
FIGURE 9 – WAFER-PAK
(Wafer – Unscribed)



Wafers are shipped between two layers of mylar or inert filter paper sandwiched between two layers of polyfoam pressed together in a plastic box. This technique prevents movement or damage to the wafer in shipment.

FIGURE 10 – VACU-PAK▲
(Wafer-Scribed and Broken on Mylar)





Each quarter wafer is scribed and broken on a sheet of mylar with the gold-backed side against the mylar. The chips stick to the mylar and maintain their exact wafer orientation and spacing. A maximum of four-quarter wafer sections are packaged as illustrated. The evacuated plastic bag is thermally sealed, holds the contents securely, and allows no chip movement. See handling precautions for Vacu-Pak Carrier.

VACU-PAK – HANDLING PRECAUTIONS

Care must be exercised when opening the package to avoid disturbing the chips. The following procedure is recommended:

Step 1: Place the Vacu-Pak on a flat surface with the opaque filter paper side of the sandwich up and the mylar side down.

Step 2. With a sharp knife, cut through three sides of the top of the plastic bag so it can be carefully rolled back. Gently hold the top piece of filter paper in position as the bag is rolled back.

Step 3. Roll back the filter paper on the top layer of scribed and broken wafer quarters making sure no chips adhere to the filter paper.

Step 4. With tweezers grasp the uppermost mylar sheet and slide the exposed quarter wafer on to a grease plate, bonding platform or container for storage. Do not make waves in the mylar.

Step 5. Keep the mylar on a flat, smooth surface. Individual chips can be easily lifted off the mylar with a vacuum pick-up needle without disturbing the remaining chips.

RECOMMENDED INCOMING INSPECTION PROCEDURES

Motorola assures that the devices will meet the customers' incoming visual inspection when inspected to the visual criteria and LTPD limits specified. Inspection must be performed at the power and magnification indicated. Motorola guarantees dc parameters to LTPD limits specified.

Return Components

It is suggested that the customer perform incoming inspection in the following sequence:

1. Visual
2. Test dc electrical parameters

A. If the lot fails visual inspection, containers must be closed and secured and the entire lot returned to Motorola with a detailed inspection report. In no case will Motorola accept rejected material that the customer has inspected 100%.

B. After the lot has passed incoming visual inspection, samples are selected and subjected to electrical tests of the dc parameters. If samples do not pass the electrical tests, they shall be packaged separately and identified with all the information from the original package of chips. The shipping container must be closed and secured. The entire lot together with the test samples and a detailed inspection report shall be returned to Motorola. In no case will Motorola accept rejected material that the customer has inspected 100%.

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MPS-U51
MPS-U60
MPS-U95

PROGRAMMABLE UNIJUNCTION CHIPS

MPU231
MPU232
MPU233

RECTIFIER CHIPS

MR323 (See 1N3492)
MR324 (See 1N3493)
MR326 (See 1N3495)
MR328
MR330
MR331
MR751
MR752
MR753
MR754
MR756
MR850
MR851
MR852
MR854
MR856
MR870
MR871
MR872
MR874
MR876
MR1121
MR1122
MR1124
MR1126
MR1128
MR1130

RF TRANSISTOR CHIPS

MRF501
MRF502
MRF5177

DUAL SWITCHING DIODE CHIP

MSD6100
MSD6101
MSD6102
MSD6150

VOLTAGE-VARIABLE CAPACITANCE DIODE CHIPS

MV104
MV109
MV1401
MV1403
MV1404
MV1405
MV1858D
MV1860D
MV1862D
MV1864D
MV1865D
MV1866D
MV1868D
MV1870D
MV2101
MV2102
MV2103
MV2104
MV2105
MV2106
MV2107
MV2108
MV2109
MV2110
MV2111
MV2112
MV2113
MV2114
MV2115
MV2301
MV2302
MV2304
MV2305
MV2306
MV2307
MV2308
MV3102
MV3103
MV3140
MV3141
MV3142

ZENER DIODE CHIPS

MZC2.4A10
MZC2.5A10
MZC2.7A10
MZC2.8A10
MZC3.0A10
MZC3.3A10
MZC3.6A10
MZC3.9A10
MZC4.3A10
MZC4.7A10
MZC5.1A10
MZC5.6A10
MZC6.0A10
MZC6.2A10
MZC6.8A10
MZC7.5A10
MZC8.2A10
MZC8.7A10
MZC9.1A10
MZC10A10
MZC11A10
MZC12A10
MZC13A10
MZC14A10
MZC15A10
MZC16A10
MZC17A10
MZC18A10
MZC19A10
MZC20A10
MZC22A10
MZC24A10
MZC25A10
MZC27A10
MZC28A10
MZC30A10
MZC33A10
MZC36A10
MZC39A10
MZC43A10
MZC47A10
MZC51A10
MZC56A10
MZC60A10
MZC62A10
MZC68A10
MZC75A10
MZC82A10
MZC87A10
MZC91A10

MZC100A10
MZC110A10
MZC120A10
MZC130A10
MZC140A10
MZC150A10
MZC160A10
MZC170A10
MZC180A10
MZC190A10
MZC200A10
MZC1.8B10
MZC2.0B10
MZC2.2B10
MZC2.4B10
MZC2.7B10
MZC3.0B10
MZC3.3B10
MZC3.6B10
MZC3.9B10
MZC4.3B10
MZC4.7B10
MZC5.1B10
MZC5.6B10
MZC6.2B10

MZC6.8B10
MZC7.5B10
MZC8.2B10
MZC8.7B10
MZC9.1B10
MZC10B10
MZC11B10
MZC12B10
MZC13B10
MZC14B10
MZC15B10
MZC16B10
MZC17B10
MZC18B10
MZC19B10
MZC20B10
MZC22B10
MZC24B10
MZC25B10
MZC27B10
MZC28B10
MZC30B10
MZC33B10
MZC36B10

MZC39B10
MZC43B10
MZC47B10
MZC51B10
MZC56B10
MZC60B10
MZC62B10
MZC68B10
MZC75B10
MZC82B10
MZC87B10
MZC91B10
MZC100B10
MZC110B10
MZC120B10
MZC130B10
MZC140B10
MZC150B10
MZC160B10
MZC160B10
MZC170B10
MZC180B10
MZC190B10
MZC200B10

INTEGRATED CIRCUIT CHIPS

BEAM-LEAD LINEAR INTEGRATED CIRCUIT CHIPS
MCBC1709
MCBC1741
MCBC1748
BEAM-LEAD MTTL INTEGRATED CIRCUIT CHIPS
MCBC5400
MCBC5401
MCBC5402
MCBC5404
MCBC5405
MCBC5410
MCBC5420
MCBC5430
MCBC5440
MCBC5450
MCBC5451
MCBC5453
MCBC5454
MCBC5460
MCBC5472
MCBC5473
MCBC5479
MDTL INTEGRATED CIRCUIT CHIPS
MCC830
MCC831
MCC832
MCC833
MCC834
MCC835
MCC836
MCC837
MCC838
MCC839
MCC840
MCC841
MCC844

MCC845
MCC846
MCC847
MCC848
MCC849
MCC850
MCC851
MCC852
MCC853
MCC855
MCC856
MCC857
MCC858
MCC861
MCC862
MCC863
MCC930
MCC931
MCC932
MCC933
MCC934
MCC935
MCC936
MCC937
MCC938
MCC939
MCC940
MCC941
MCC944
MCC945
MCC946
MCC947
MCC948
MCC949
MCC950
MCC951
MCC952
MCC953
MCC955
MCC956
MCC957
MCC958
MCC961

MCC962
MCC963
MECL II INTEGRATED CIRCUIT CHIPS
MCC1001
MCC1002
MCC1003
MCC1004
MCC1005
MCC1006
MCC1007
MCC1008
MCC1009
MCC1010
MCC1011
MCC1012
MCC1013
MCC1014
MCC1015
MCC1016
MCC1017
MCC1018
MCC1019
MCC1020
MCC1021
MCC1022
MCC1023
MCC1024
MCC1025
MCC1026
MCC1027
MCC1028
MCC1029
MCC1030
MCC1031
MCC1032
MCC1033
MCC1034
MCC1035
MCC1036
MCC1037
MCC1038

INDEX (continued)

MCC1039
MCC1040
MCC1042
MCC1043
MCC1044
MCC1045
MCC1047
MCC1048
MCC1059
MCC1062
MCC1063
MCC1066
MCC1067
MCC1068
MCC1070
MCC1201
MCC1202
MCC1203
MCC1204
MCC1205
MCC1206
MCC1207
MCC1208
MCC1209
MCC1210
MCC1211
MCC1212
MCC1213
MCC1214
MCC1215
MCC1216
MCC1217
MCC1218
MCC1219
MCC1220
MCC1221
MCC1222
MCC1223
MCC1224
MCC1225
MCC1226
MCC1227
MCC1228
MCC1229
MCC1230
MCC1231
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MCC1235
MCC1236
MCC1237
MCC1238
MCC1239
MCC1240
MCC1242
MCC1243
MCC1244
MCC1245
MCC1247
MCC1248
MCC1259
MCC1262
MCC1263
MCC1265
MCC1266
MCC1267
MCC1268
MCC1270

LINEAR INTEGRATED CIRCUIT CHIPS

MCC1436
MCC1439
MCC1458
MCC1463
MCC1469
MCC1495
MCC1536
MCC1539
MCC1558
MCC1563
MCC1569
MCC1595

MECL III INTEGRATED CIRCUIT CHIPS

MCC1648
MCC1654
MCC1660
MCC1661
MCC1662
MCC1663
MCC1664
MCC1665
MCC1666
MCC1667
MCC1668
MCC1669
MCC1670
MCC1671
MCC1672
MCC1673
MCC1674
MCC1675
MCC1678
MCC1679
MCC1680
MCC1682
MCC1684
MCC1692
MCC1694

LINEAR INTEGRATED CIRCUIT CHIPS

MCC1709
MCC1709C
MCC1710
MCC1710C
MCC1711
MCC1711C
MCC1723
MCC1723C
MCC1741
MCC1741C
MCC1748
MCC1748C

MTTL INTEGRATED CIRCUIT CHIPS

MCC5400
MCC5401
MCC5402
MCC5403
MCC5404
MCC5405
MCC5406
MCC5407
MCC5408
MCC5409
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MCC5449
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MCC5451
MCC5453
MCC5454
MCC5460
MCC5470
MCC5472
MCC5473
MCC5475
MCC5476
MCC5479
MCC5480
MCC15482
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MCC5483
MCC5484
MCC5490
MCC5491
MCC5492
MCC5493
MCC5494
MCC5495
MCC5496
MCC54100
MCC54107
MCC54121
MCC54150
MCC54151
MCC54H05
MCC54H08
MCC54H10
MCC54H11
MCC54H20
MCC54H21
MCC54H22
MCC54H30
MCC54H40
MCC54H50
MCC54H51
MCC54H52
MCC54H53
MCC54H54
MCC54H55
MCC54H60
MCC54H61
MCC54H62
MCC54H71
MCC54H72
MCC54H73
MCC54H74A

MTTL INTEGRATED CIRCUIT CHIPS

MCC7241
MCC7242
MCC7250
MCC7251
MCC7260
MCC7261
MCC7266
MCC7267
MCC7270
MCC7271
MCC7280
MCC7281
MCC7400

INDEX (continued)

MCC7401
MCC7402
MCC7403
MCC7404
MCC7405
MCC7406
MCC7407
MCC7408
MCC7409
MCC7410
MCC7416
MCC7417
MCC7420
MCC7430
MCC7440
MCC7441
MCC7442
MCC7443
MCC7444
MCC7445
MCC7446
MCC7447
MCC7448
MCC7449
MCC7450
MCC7451
MCC7453
MCC7454
MCC7460
MCC7470
MCC7472
MCC7473
MCC7475
MCC7476
MCC7479
MCC7480
MCC17482
MCC27482
MCC7483
MCC7484
MCC7490
MCC7491
MCC7492
MCC7493
MCC7494
MCC7495
MCC7496
MCC74100
MCC74107
MCC74121
MCC74150
MCC74151
MCC74H05
MCC74H08
MCC74H10
MCC74H11
MCC74H20
MCC74H21
MCC74H22
MCC74H30
MCC74H40
MCC74H50
MCC74H51
MCC74H52
MCC74H53
MCC74H54
MCC74H55
MCC74H60
MCC74H61
MCC74H62
MCC74H71
MCC74H72
MCC74H73
MCC74H74A

MCC8241
MCC8242
MCC8250
MCC8251
MCC8260
MCC8261
MCC8266
MCC8267
MCC8270
MCC8271
MCC8280
MCC8281
MCC8300
MCC8301
MCC8304
MCC8306
MCC8307
MCC8308
MCC8309
MCC8310
MCC8311
MCC8312
MCC8314
MCC8316
MCC8318
MCC8322
MCC8324
MCC8328
MCC8601
MCC8602
MCC9300
MCC9301
MCC9304
MCC9306
MCC9307
MCC9309
MCC9310
MCC9312
MCC9314
MCC9316
MCC9318
MCC9322
MCC9324
MCC9328
MCC9601
MCC9602

MECL 10,000 INTEGRATED CIRCUIT CHIPS

MCC10101
MCC10102
MCC10105
MCC10106
MCC10107
MCC10109
MCC10110
MCC10111
MCC10115
MCC10116
MCC10117
MCC10118
MCC10119
MCC10121
MCC10124
MCC10125
MCC10130
MCC10131
MCC10132
MCC10133
MCC10134
MCC10135
MCC10141
MCC10160
MCC10161
MCC10162
MCC10164
MCC10174
MCC10179
MCC10181
MCC10501
MCC10502
MCC10505
MCC10506
MCC10507
MCC10509
MCC10515
MCC10516
MCC10531

McMOS INTEGRATED CIRCUIT CHIPS

MCC14000
MCC14001
MCC14002
MCC14006
MCC14007
MCC14008
MCC14009
MCC14010
MCC14011
MCC14012
MCC14013
MCC14015
MCC14016
MCC14017
MCC14021
MCC14023
MCC14025
MCC14027
MCC14028
MCC14032
MCC14038
MCC14040
MCC14501
MCC14502
MCC14505
MCC14506
MCC14507
MCC14508
MCC14510
MCC14512
MCC14514
MCC14515
MCC14516
MCC14518
MCC14519
MCC14520
MCC14522
MCC14526
MCC14527
MCC14528
MCC14529
MCC14581
MCC14582

LINEAR INTEGRATED CIRCUIT FLIP–CHIPS

MCCF1458
MCCF1558
MCCF1709
MCCF1709C
MCCF1741
MCCF1741C

UNENCAPSULATED SMALL-SIGNAL TRANSISTORS

. . . with passivated annular construction that provides high reliability and consistent performance. These transistors are listed in order of decreasing breakdown voltage (BV_{CEO}).

SWITCHING TRANSISTORS (T_A = 25°C)

Device Type	BV_{CEO} @ I_C = 10 mA Volts Min	I_C Peak† mA	h_{FE} Min/Max	@ I_C mA	$V_{CE(sat)}$ Volts Max	@ I_C mA	C_{ob} pF Max	f_T MHz	t_d, t_r t_{on}* ns Max	t_s, t_f t_{off}* ns Max
NPN										
MMCS3507	50	3000	30/150	1500	1.0	1500	40	50	18,40	65,40
MMCS3725	50	1000	60/150	100	0.42	500	10	200	45*	75*
MMCS3444	50	1000	20/60	500	0.6	500	12	150	18,40	50,35
MMCS3506	40	3000	40/200	1500	1.0	1500	40	50	18,40	65,40
MMCS3253	40	1000	25/75	500	0.6	500	12	150	18,40	50,35
MMCS3724	30	1000	60/150	100	0.42	500	12	200	45*	75*
MMCS3252	30	1000	30/90	500	0.5	500	12	180	18,35	50,35
MMCS3227	20	500†	100/300	10	0.25	10	4.0	500	15*	20*
MMCS2369A	15	500†	40/120	10	0.25	10	4.0	500	15*	20*
MMCS2369	15	200	30/–	30	0.2	10	4.0	500	14*	20*
MMCS3959	12	30	40/200	10	0 2	1.0	2.5	1100	2.4,3.0(1)	1.6,3.3(1)
MMCS709	6.0	100	20/200	10	0.35	3.0	3.0	500	18*	18*
PNP										
MMCS3763	60	1500	20/80	1000	0.9	1000	18	120	10,40	95,40
MMCS3468	50	1000	25/75	500	0.6	500	25	140	10,30	80,30
MMCS3762	40	1500	30/120	1000	0.9	1000	18	150	10,40	95,40
MMCS3467	40	1000	40/120	500	0.5	500	25	160	10,30	80,30
MMCS4260	15	30	30/150	10	0.35	10	2.5	1000	1.0,0.5(1)	1.0,1.0(1)
MMCS2894	12	200	40/150	30	0.2	30	6.0	320	70*	100*
MMCS3546	12	200	30/120	10	0.15	10	6.0	700	48*	35*

SWITCHING AND AMPLIFIER TRANSISTORS

Device Type	BV_{CEO} Volts Min	@ I_C mA	I_C mA	h_{FE} Min/Max	@ I_C mA	$V_{CE(sat)}$ Volts Max	@ I_C mA	f_T MHz	t_d, t_r t_{on}* ns Max	t_s, t_f t_{off}* ns Max
NPN										
MMCS3500(1)	150	10	300	40/120	150	0.4	150	150	20,35	300,80
MMCS3501(1)	150	10	300	100/300	150	0.4	150	150	20,35	300,80
MMCS3498(1)	100	10	500	40/120	150	0.6	300	150	30,35	300,80
MMCS3499(1)	100	10	500	100/300	150	0.6	300	150	20,35	300,80
MMCS2193	50	25	1000	40/120	150	0.35	150	40	– ,85	180,60
MMCS2192	40	25	1000	100/300	150	0.35	150	40	– ,85	180,60
MMCS2221A	40	10	800	40/120	150	0.3	150	250	26*(1)	70*(1)
MMCS2222A	40	10	800	100/300	150	0.3	150	250	26*(1)	70*(1)
MMCS3903	40	10	200	50/150	10	0.2	10	200	40,40	200,60
MMCS3904	40	1.0	200	100/300	10	0.2	10	250	40,40	240,60
MMCS4400	40	1.0	600	50/150	150	0.4	150	180	18,25	260,35
MMCS4401	40	1.0	600	100/300	150	0.4	150	230	18,25	260,35
MMCS2221	30	10	800	40/120	150	0.4	150	100	26*(1)	70*(1)
MMCS2222	30	10	800	100/300	150	0.4	150	100	26*(1)	70*(1)
PNP										
MMCS3636(1)	175	10	1000	50/150	50	0.5	50	–	480*	720*
MMCS3637(1)	175	10	1000	100/300	50	0.5	50	–	480*	720*
MMCS3634(1)	140	10	1000	50/150	50	0.5	50	–	480*	720*
MMCS3635(1)	140	10	1000	100/300	50	0.5	50	–	480*	720*
MMCS2906A	60	10	600	40/120	150	0.4	150	–	26*(1)	70*(1)
MMCS2907A	60	10	600	100/300	150	0.4	150	–	26*(1)	70*(1)
MMCS3250A	60	10	200	50/150	10	0.25	10	–	40,40	200,60
MMCS3251A	60	10	200	100/300	10	0.25	10	–	40,40	240,60
MMCS2906	40	10	600	40/120	150	0.4	150	–	26*(1)	70*(1)
MMCS2907	40	10	600	100/300	150	0.4	150	–	26*(1)	70*(1)
MMCS3250	40	10	200	50/150	10	0.25	10	–	40,40	200,60
MMCS3251	40	10	200	100/300	10	0.25	10	–	40,40	240,60
MMCS3905	40	1.0	200	50/150	10	0.25	10	–	40,40	240,70
MMCS3906	40	1.0	200	100/300	10	0.25	10	–	40,40	250,85
MMCS4402	40	1.0	600	50/100	150	0.4	150	–	18,25	260,35
MMCS4403	40	1.0	600	100/300	150	0.4	150	–	18,25	260,35

*AC parameter values are as specified in the standard 2N data sheets. (encapsulated devices)

(1)Typical Switching Times

CHIPS (continued)

SILICON AMPLIFIER TRANSISTORS (T_A = 25°C)

Device Type	BV_{CEO} @ Volts Min	I_C mA	I_C mA	h_{FE} @ Min/Max	I_C µA mA*	C_{ob} pF Max	NF dB Max	f Hz	f_T MHz
NPN									
MMCS910	60	30	–	75/–	10*	15	14	1 K	50
MMCS2483	60	10	50	75/–	100	6.0	5.0	10-15.7 K	60
MMCS2484	60	10	50	175/–	100	6.0	4.0	10-15.7 K	60
MMCS929	45	10	30	60/–	500	8.0	5.0	10-15.7 K	30
MMCS930	45	10	30	150/–	500	8.0	4.0	10-15.7 K	30
MMCS5088	30	1.0	50	300/900	100	–	4.0	10-15.7 K	40
MMCS918	15	3.0	50	20/–	3.0*	1.7	6.5	60 M	600
PNP									
MMCS3798	60	10	50	150/450	500	4.0	1.0 typ	1 K	24
MMCS3799	60	10	50	300/900	500	4.0	0.8 typ	1 K	24
MMCS5087	30	1.0	50	250/800	100	4.0	3.0	10-15.7 K	32

These devices are passivated silicon high-frequency RF transistor chips and are listed in order of decreasing breakdown voltage (BV_{CEO}).

RF TRANSISTORS (T_A = 25°C)

Device Type	BV_{CEO} @ Volts Min	I_C mA	G_{pe} @ dB Typ	f MHz	P_{out} $P_{out(osc)}$* Watt Typ	P_{in} & Watt	V_{CE} & Volts	f MHz	NF @ dB Typ	f MHz	h_{FE} @ Min/Max	I_C mA	f_T MHz Typ Min**
NPN													
MMCS5636	35	200	7.0	400	8.4	2.0	28	400	–	–	5.0/ –	200	–
MMCS3866	30	5.0	11	400	1.3	0.1	28	400	–	–	10/200	50	800
MMCS0172	30	5.0	11.4*	200	–	–	–	–	2.7	200	30/ –	50	1500
MMCS2857	15	3.0	15	450	0.035*	–	10	500	4.0	450	30/150	3.0	1500
MMCS0159	10	1.0	–	–	–	–	–	–	–	–	25/200	25	2000
PNP													
MMCS5160	40	5.0	8.0	400	1.2	0.16	28	400	–	–	10/ –	50	400**
MMCS4957	30	10	18	450	–	–	–	–	3.2	450	20/ –	2.0	1000**
MMCS5583	30	10	–	–	–	–	–	–	–	–	25/ –	100	1000**

*AC parameter values are as specified in the standard 2N or MM data sheets (encapsulated devices).

These devices are passivated Field-Effect transistor chips and are listed in order of decreasing breakdown voltage ($V_{BR(DSS)}$ or $V_{BR(GSS)}$).

FIELD-EFFECT TRANSISTORS (T_A = 25°C)

MOS FETS

Device Type	$V_{BR(DSS)}$ Volts Min	$V_{GS(th)}$ Volts Min/Max	I_{DSS} nA Max	$r_{ds(on)}$ Ohms Max	t_d, t_r ns Max	t_s, t_f ns Max
N-Channel						
MMCS0122	25	1.0/5.0	10	300	45,65	60,100
P-Channel						
MMCS0123	-25	-1.0/-5.0	-10	600	45,65	60,1000

JUNCTION FETS

Device Type	$V_{BR(GSS)}$ Volts Min	I_{DSS} mA Min/Max	C_{rss} pF Max	$r_{DS(on)}$ Ohms Max
N-Channel				
MMCS0134	30	8.0/ –	5.0	100
MMCS0130	-25	2.0/20	3.0	–
MMCS0131	-25	1.0/16	3.0	–
P-Channel				
MMCS0125	40	0.5/14	2.0	–

UNENCAPSULATED SILICON POWER TRANSISTORS

The tables on the following pages provide listings of standard Motorola power transistor chips. These chips have the same electrical characteristics as their packaged component equivalents. In a few instances, the unencapsulated chips are not sold as packaged units. For these exceptions, tables with major electrical characteristics are provided in this section.

The Motorola power chip family features:

- Broad selection of silicon power devices, including both passivated and mesa construction.
- Power Darlington transistor chips;
- Quality assurance that is associated with devices taken from the standard Motorola high-volume power transistor production lines;
- Guaranteed specifications and detailed physical description of chip size, bonding areas and other pertinent design data.

ORDERING INFORMATION

Due to the various chip options available, the following are to be used in specifying mounting options.

1. Chip
2. Chip on Button
3. Chip on Button with Wires
4. Power Pill

To order specific die backing options use the following letter:

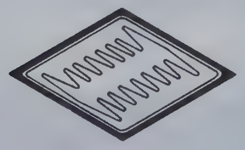
A. Chrome-Silver
B. Gold

Note (1) The available chip mounting and backing options are shown preceding the tables.

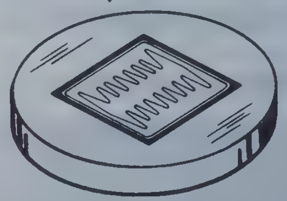
Note (2) The type numbers are identified as MJC numbers.

Dimensions Include thickness of Die

1. Chip

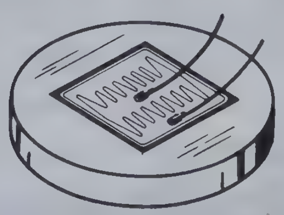


2. Chip on Button



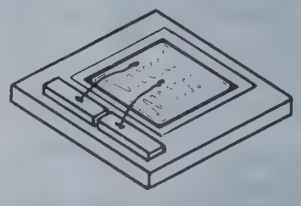
Diameter of button – 330 mils
Height of button – 75 mils

3. Chip on Button with Wires



Add 25 mils for chip and wires

4. Power Pill



375 mils square
100 mils thick (includes wire and isolation pads)

The following diagram explains the method used for ordering specific power transistor chips.

MJC	4918	–	3	A
MJC Identifies Chip Device	Motorola Part No.		Chip Mounting Option	Chip Backing Option

HANDLING PRECAUTIONS

Although the care and handling of unencapsulated semiconductors often require precautions outside the experience of many equipment manufacturers, Motorola warrants that such devices meet or exceed the published specifications, provided these basic requirements are met in the customer's establishment.

1. Such devices are stored in an environment of no more than 30% relative humidity.

2. Devices are die-and-wire bonded in an inert atmosphere not exceeding 400°C.

3. Processing equipment conforms to the minimum standards of equipment normally employed in semiconductor establishments.

4. Mesa Types – Mesa transistor chips have exposed collector-base junctions, therefore, it is important that the following procedures be implemented:

a. Properly clean the die, prior to encapsulation, i.e., ultrasonic cleaning in a solvent such as Xylene or Trichloroethylene.

b. Completely coat the exposed junction area with Dow Corning 997 or equivalent semiconductor coating.

Motorola's engineering staff is available for consultation in the event of correlation or processing problems encountered in the use of Motorola semiconductor chips. For assistance of this nature, please contact your nearest Motorola sales representative.

HIGH-CURRENT PASSIVATED POWER TRANSISTORS

(Gold-Backed Transistor Chip)

Motorola's passivated transistors have excellent high-speed characteristics which make these devices particularly well suited for switching and high-frequency amplifier applications. They also are used in low-frequency amplifier applications where moderate Safe Operating Area can be tolerated. Passivated transistor chips are especially useful in hybrid circuits because they require fewer handling, cleaning and protective precautions than Mesa-type transistors.

These devices listed below are available in the following mounting styles unless otherwise noted:

1. unmounted chip (*Indicates availability in unmounted chip style only)
2. chip mounted on button
3. chip on button with wires
4. power pill

These devices are all gold backed except **BOLD FACE** type indicates availability with chrome-silver backing also.

Within each table, the transistors are listed in increasing order of current. For detailed specifications, see the Motorola data sheet of the equivalent standard encapsulated device.

NPN		PNP		
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max
MJC5681	**2N5681**	**MJC5679**	**2N5679**	1.0
MJC5682	**2N5682**	**MJC5680**	**2N5680**	1.0
		MJC3021	2N3021	3.0
		MJC3024	2N3024	
		MJC3719	2N3719	
MJC4237	2N4237	MJC4234	2N4234	
		MJC3867	2N3867	
		MJC3022	2N3022	
		MJC3025	2N3025	
		MJC3720	2N3720	
		MJC3023	2N3023	
MJC4238	2N4238	MJC4235	2N4235	
MJC5334	2N5334			
		MJC3868	2N3868	
MJC180	MJE180	MJC170	MJE170	
		MJC3026	2N3026	
MJC4239	2N4239	MJC4236	2N4236	
MJC5335	2N5335			
		MJC6303	2N6303	
MJC181	MJE181	MJC171	MJE171	
MJC182	MJE182	MJC172	MJE172	↓
MJC220	MJE220	MJC230	MJE230	4.0
MJC221	MJE221	MJC231	MJE231	
MJC222	MJE222	MJC232	MJE232	
		MJC3740	**2N3740**	
MJC4788	2N4788			
MJC223	MJE223	MJC233	MJE233	
MJC224	MJE224	MJC234	MJE234	
MJC225	MJE225	MJC235	MJE235	
MJC3766	**2N3766**			
MJC240	MJE240	MJC250	MJE250	
		MJC3741	**2N3741**	
MJC241	MJE241	MJC251	MJE251	
MJC242	MJE242	MJC252	MJE252	
MJC3767	**2N3767**			
MJC243	MJE243	MJC253	MJE253	
MJC244	MJE244	MJC254	MJE254	↓
MJC200	MJE200	MJC210	MJE210	5.0
		MJC8100	MJ8100	
		MJC8101	MJ8101	↓

NPN				
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max
MJC5336	2N5336	MJC6190	2N6190	5.0
MJC5337	2N5337	MJC6191	2N6191	
MJC5338	2N5338	MJC6192	2N6192	
MJC5339	2N5339	MJC6193	2N6193	↓
		MJC500	MJ500	7.0
		MJC6700	MJ6700	
		MJC501	MJ501	
		MJC6701	MJ6701	
MJC5427	2N5427			
MJC5428	2N5428			
MJC5429	2N5429			
MJC5430	2N5430			↓
MJC3445	2N3445			7.5
MJC3447	2N3447			
MJC3446	2N3446			
MJC3448	2N3448			↓
MJC5477	2N5477	MJC6182	2N6182	10
MJC5346	2N5346	MJC6186	2N6186	
MJC5478	2N5478	MJC6183	2N6183	
MJC5347	2N5347	MJC6187	2N6187	
MJC5479	2N5479	MJC6184	2N6184	
MJC5348	2N5348	MJC6188	2N6188	
MJC5480	2N5480	MJC6185	2N6185	
MJC5349	2N5349	MJC6189	2N6189	↓
MJC6338	2N6338			25
MJC6339	2N6339			
MJC6340	2N6340			
MJC6341	2N6341			↓
*MJC7000	MJ7000			30
*MJC6274	2N6274			50
*MJC6278	2N6278			
*MJC6275	2N6275			
*MJC6279	2N6279			
*MJC6276	2N6276			
*MJC6280	2N6280			
*MJC6277	2N6277			
*MJC6281	2N6281			↓
*MJC7200	MJ7200			60
*MJC7201	MJ7201			60

The following devices are available in chip form only.

NPN		PNP		ELECTRICAL CHARACTERISTICS										
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max	V_{CBO} Volts	V_{CEO} Volts	h_{FE} @ Min	I_C Amp	h_{FE} @ Min	I_C Amp	$V_{CE(sat)}$ @ Volts Max	I_C Amp	f_T MHz Min	P_D Watts
MJC044		MJC043		1.0	60	60	30	0.25	–	–	1.0	1.0	3.0	–
MJC440	MJ440	MJC430	MJ430	3.0	40	40	25	0.25	20	0.5	0.5	0.75	3.0	6.0
MJC076		MJC007		3.0	50	50	20	0.18	–	–	1.0	1.5	30	–
		MJC3740A	**2N3740A**	**4.0**	**60**	**60**	**30**	**0.25**	**10**	**1.0**	**0.6**	**1.0**	**4.0**	**25**
		MJC3741A	**2N3741A**	**4.0**	**80**	**80**	**30**	**0.25**	**10**	**1.0**	**0.6**	**1.0**	**4.0**	**25**
MJC082		MJC067		5.0	60	60	30	2.0	–	–	2.0	5.0	30	–
*MJC070		MJC069		25	60	60	20	10	–	–	3.0	25	30	–

HIGH-VOLTAGE PASSIVATED POWER TRANSISTORS

The devices listed below are available in the following mounting styles:

1. unmounted chip
2. chip mounted on button
3. chip on button with wires
4. power pill

These devices are all gold-backed except **BOLD FACE** type indicates chrome-silver backing only.

Within each table, the transistors are listed in increasing order of current. For detailed specifications see the Motorola data sheet of the equivalent standard encapsulated device.

NPN		
Chip Type	Standard Device Type	I_C Amp Max
MJC420	MJ420	0.1
MJC421	MJ421	0.1
MJC3440	MJE3440	0.3
MJC3439	MJE3439	0.3
MJC341	MJE341	0.5
MJC344	MJE344	↓
MJC5655	2N5655	↓
MJC2251	MJ2251	↓
MJC2252	MJ2252	↓
MJC340	MJE340	↓
MJC5656	2N5656	↓

NPN		
Chip Type	Standard Device Type	I_C Amp Max
MJC345	MJE345	0.5
MJC5657	2N5657	0.5
MJC3440	2N3440	1.0
MJC3439	2N3439	1.0
MJC2160	**MJE2160**	**1.5**
MJC3738	**2N3738**	**3.0**
MJC3739	**2N3739**	**3.0**
MJC6233	**2N6233**	**5.0**
MJC6234	**2N6234**	**5.0**
MJC6235	**2N6235**	**5.0**

The following devices are available in chip form only.

PNP		ELECTRICAL CHARACTERISTICS										
					h_{FE} @	I_C	h_{FE} @	I_C	$V_{CE(sat)}$ @	I_C		
Chip Type	Standard Device Type	I_C Amp Max	V_{CBO} Volts	V_{CEO} Volts	Min	Amp	Min	Amp	Volts Max	Amp	f_T MHz Min	P_D Watts
MJC350	MJE350	0.5	300	300	30	0.05	–	–	–	–	–	–

DARLINGTON POWER TRANSISTORS (Mesa)

(Chrome-Silver Backed Transistor Chip)

Motorola Darlington devices consist of a driver and output transistor interconnected, with two resistors to form a high-gain monolithic circuit. Utilizing the epitaxial-base process, the devices listed below provide excellent Safe Operating Area and both NPN and PNP polarity. Because the collector-base junctions of these transistor chips are not passivated, careful handling and cleaning precautions must be followed.

The devices listed below are available in the following mounting styles:

1. unmounted chip
2. chip mounted on button
3. chip on button with wires
4. power pill

Within each table, the transistors are listed in increasing order of current. For detailed specifications see the Motorola data sheet of the equivalent standard encapsulated device.

NPN		PNP		
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max
MJC800	MJE800	MJC700	MJE700	4.0
MJC801	MJE801	MJC701	MJE701	↓
MJC6294	2N6294	MJC6296	2N6296	↓
MJC4000	MJ4000	MJC4010	MJ4010	↓
MJC802	MJE802	MJC702	MJE702	↓
MJC803	MJE803	MJC703	MJE703	↓
MJC6295	2N6295	MJC6297	2N6297	↓
MJC4001	MJ4001	MJC4011	MJ4011	↓
MJC1100	MJE1100	MJC1090	MJE1090	5.0
MJC1101	MJE1101	MJC1091	MJE1091	↓
MJC1102	MJE1102	MJC1092	MJE1092	↓
MJC1103	MJE1103	MJC1093	MJE1093	↓
MJC6300	2N6300	MJC6298	2N6298	8.0
MJC6055	2N6055	MJC6053	2N6053	↓
MJC1000	MJ1000	MJC900	MJ900	↓

NPN		PNP		
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max
MJC6301	2N6301	MJC6299	2N6299	8.0
MJC6056	2N6056	MJC6054	2N6054	↓
MJC1001	MJ1001	MJC901	MJ901	↓
MJC3000	MJ3000	MJC2500	MJ2500	10
MJC3001	MJ3001	MJC2501	MJ2501	10
MJC6057	2N6057	MJC6050	2N6050	12
MJC6058	2N6058	MJC6051	2N6051	12
MJC6059	2N6059	MJC6052	2N6052	12
MJC4033	MJ4033	MJC4030	MJ4030	16
MJC4034	MJ4034	MJC4031	MJ4031	16
MJC4035	MJ4035	MJC4032	MJ4032	16
MJC6282	2N6282	MJC6285	2N6285	20
MJC6283	2N6283	MJC6286	2N6286	20
MJC6284	2N6284	MJC6287	2N6287	20

MESA POWER TRANSISTORS

(Chrome-Silver Backed Transistor Chip)

Mesa transistor chips are constructed by the Epi-Base process and provide the best combination of ruggedness, low saturation voltages and frequency response (good switching) of any process in the industry. Transistors constructed by this process are well suited for amplifier and medium-speed switching applications. Because the collector-base junctions of these transistor chips are not passivated, careful handling and cleaning precautions must be followed (see Handling Precautions).

The devices listed below are available in the following mounting styles unless otherwise noted:

1. unmounted chip (*Indicates availability in unmounted chip style only.)
2. chip mounted on button
3. chip on button with wires
4. power pill

These devices are all chrome-silver backed except BOLD FACE type indicates availability in gold backing also.

Within each table the transistors are listed in increasing order of current. For detailed specifications see the Motorola data sheet of the equivalent standard encapsulated device.

NPN		PNP		
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max
MJC4910	2N4910	MJC4898	2N4898	1.0
MJC4921	2N4921	MJC4918	2N4918	↓
MJC4911	2N4911	MJC4899	2N4899	↓
MJC4922	2N4922	MJC4919	2N4919	↓
MJC4912	2N4912	MJC4900	2N4900	↓
MJC4923	2N4923	MJC4920	2N4920	↓
MJC2249	MJ2249	MJC2253	MJ2253	2.0
MJC2250	MJ2250	MJC2254	MJ2254	2.0
MJC520	MJE520	MJC370	MJE370	3.0
MJC5190	2N5190	MJC5193	2N5193	4.0
MJC480	MJ480	MJC490	MJ490	↓
MJC521	MJE521	MJC371	MJE371	↓
MJC5191	2N5191	MJC5194	2N5194	↓
MJC481	MJ481	MJC491	MJ491	↓
MJC5192	2N5192	MJC5195	2N5195	↓
MJC3054A	2N3054A	MJC6049	2N6049	↓
MJC5067	2N5067	MJC4901	2N4901	5.0
MJC4913	2N4913	MJC4904	2N4904	↓
MJC4231A	2N4231			↓
MJC5068	2N5068	MJC4902	2N4902	↓
MJC5869	2N5869	MJC5867	2N5867	↓
MJC5977	2N5977	MJC5974	2N5974	↓
MJC4914	2N4914	MJC4905	2N4905	↓
MJC4232A	2N4232			↓
MJC5978	2N5978	MJC5975	2N5975	↓
MJC5069	2N5069	MJC4903	2N4903	↓
MJC5870	2N5870	MJC5868	2N5868	↓
MJC4915	2N4915	MJC4906	2N4906	↓
MJC4233A	2N4233			↓
MJC5979	2N5979	MJC5976	2N5976	↓
MJC205	MJE205	MJC105	MJE105	6.0
MJC5758	2N5758	MJC6226	2N6226	↓
MJC5759	2N5759	MJC6227	2N6227	↓
MJC5760	2N5760	MJC6228	2N6228	↓
MJC5983	**2N5983**	**MJC5980**	**2N5980**	**8.0**
MJC5984	**2N5984**	**MJC5981**	**2N5981**	**8.0**

NPN		PNP		
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max
MJC5985	**2N5985**	**MJC5982**	**2N5982**	**8.0**
MJC2840	**MJ2840**	**MJC2940**	**MJ2940**	**10**
MJC5877	**2N5877**	**MJC5875**	**2N5875**	↓
MJC2801	**MJE2801**	**MJC2901**	**MJE2901**	↓
MJC3713	**2N3713**	**MJC3789**	**2N3789**	↓
MJC3715	**2N3715**	**MJC3791**	**2N3791**	↓
MJC2841	**MJ2841**	**MJC2941**	**MJ2941**	↓
MJC5878	**2N5878**	**MJC5876**	**2N5876**	↓
MJC3714	**2N3714**	**MJC3790**	**2N3790**	↓
MJC3716	**2N3716**	**MJC3792**	**2N3792**	↓
MJC5632	2N5632	MJC6229	2N6229	↓
MJC5633	2N5633	MJC6230	2N6230	↓
MJC5634	2N5634	MJC6231	2N6231	↓
MJC5989	2N5989	MJC5986	2N5986	12
MJC5990	2N5990	MJC5987	2N5987	12
MJC5991	2N5991	MJC5988	2N5988	12
MJC1660	MJE1660	MJC1290	MJE1290	15
MJC1661	MJE1661	MJC1291	MJE1291	↓
MJC5881	2N5881	MJC5879	2N5879	↓
MJC5882	2N5882	MJC5880	2N5880	↓
MJC3055	**MJE3055**	**MJE2955**	**MJC2955**	↓
MJC3055A	**2N3055**	**MJC2955A**	**MJ2955**	↓
MJC5629	2N5629	MJC6029	2N6029	16
MJC5630	2N5630	MJC6030	2N6030	16
MJC5631	2N5631	MJC6031	2N6031	16
MJC5303	**2N5303**	**MJC5745**	**2N5745**	**20**
MJC3772	**MJ3772**			**20**
MJC5885	**2N5885**	**MJC5883**	**2N5883**	**25**
MJC5886	**2N5886**	**MJC5884**	**2N5884**	**25**
MJC5301	**2N5301**	**MJC4398**	**2N4398**	**30**
MJC3771	**MJ3771**			↓
MJC5302	**2N5302**	**MJC4399**	**2N4399**	↓
MJC802A	**MJ802**	**MJC4502**	**MJ4502**	↓
*MJC5685	2N5685	MJC5683	2N5683	50
*MJC5686	2N5686	MJC5684	2N5684	50

The following devices are available in chip form only.

NPN		PNP		ELECTRICAL CHARACTERISTICS										
Chip Type	Standard Device Type	Chip Type	Standard Device Type	I_C Amp Max	V_{CBO} Volts	V_{CEO} Volts	h_{FE} @ Min	I_C Amp	h_{FE} @ Min	I_C Amp	$V_{CE(sat)}$ @ Volts Max	I_C Amp	f_T MHz Min	P_D Watts
MJC488	MJE488			4.0	60	50	25	1.5	–	–	0.5	1.0	4.0	40
		MJC6212	2N6212	5.0	50	40	25	1.5	10	3.0	0.7	1.5	4.0	75
MJC2055	MJE2055			5.0	70	60	20	4.0	–	–	1.1	4.0	2.0	75
		MJC6213	2N6213	5.0	70	60	25	1.5	10	3.0	0.7	1.5	4.0	75
		MJC6214	2N6214	5.0	90	80	25	1.5	10	3.0	0.7	1.5	4.0	75
MJC2802	**MJ2802**	**MJC2902**	**MJ2902**	**15**	**70**	**60**	**15**	**8.0**	–	–	**1.5**	**8.0**	–	**117**

CHIPS (continued)

MMCRA 1000 FB

THIN-FILM RESISTOR CHIPS

. . . The MMCRA1000FB line of thin-film chip resistors covers the resistance values of 0.1 Ohm through 5.11 Megohms. The resistors are made of thin-film nichrome deposited over an isolation layer of SiO_2 grown on P-type silicon.

The 98 resistance values (100 Ohm through 1.10 Megohms) shown in the following table are maintained in stock. All of these devices have:

1. Resistance Tolerance of ±1%
2. Gold Back Metalization
3. Aluminum Front Metalization
4. Are Glass passivated and designated by MMCRAXXXXFB.

These resistor chips are stocked in packages of 10, 100 and 400, dependent on die size.

STANDARD RESISTORS AVAILABLE FROM STOCK

MMCRAXXXXFB	Resistance Value Ohms
1000	100
1100	110
1210	121
1300	130
1500	150
1620	162
1820	182
2000	200
2210	221
2430	243
2670	267
3010	301
3320	332
3570	357
3920	392
4320	432
4640	464
5110	511
5620	562
6190	619
6810	681
7500	750
8250	825
9090	909
1001	1000
1101	1100
1211	1210
1301	1300
1501	1500
1621	1620
1821	1820
2001	2000
2211	2210
2431	2430
2671	2670
3011	3010
3321	3320
3571	3570
3921	3920
4321	4320
4641	4640
5111	5110
5621	5620
6191	6190
6811	6810
7501	7500
8251	8250
9091	9090
1002	10 k

MMCRAXXXXFB	Resistance Value Ohms
1102	11 k
1212	12.1 k
1302	13 k
1502	15 k
1622	16.2 k
1822	18.2 k
2002	20 k
2212	22.1 k
2432	24.3 k
2672	26.7 k
3012	30.1 k
3322	33.2 k
3572	35.7 k
3922	39.2 k
4322	43.2 k
4642	46.4 k
5112	51.1 k
5622	56.2 k
6192	61.9 k
6812	68.1 k
7502	75 k
8252	82.5 k
9092	90.9 k
1003	100 k
1103	110 k
1213	121 k
1303	130 k
1503	150 k
1623	162 k
1823	182 k
2003	200 k
2213	221 k
2433	243 k
2673	267 k
3013	301 k
3323	332 k
3573	357 k
3923	392 k
4323	432 k
4643	464 k
5113	511 k
5623	562 k
6193	619 k
6813	681 k
7503	750 k
8253	825 k
9093	909 k
1004	1.0 M
1104	1.1 M

Custom Devices

Resistors

In addition to the standard MMCRA1000FB devices, any specific resistor value of 0.1 Ohm through 5.11 Megohm can be provided. Other special features that can be provided are:

TCR absolute to ⩽10 ppm/°C
Resistance tolerance to 0.01%
SiO_2 thickness to 30 k Å
Chip thickness to 14 mils on silicon
Resistors on ceramic, glass or sapphire
Beam-Lead resistors

Networks and Arrays:

Custom resistor networks and arrays can be built to customer's specific requirements. The same technology is used as for the MMCRA resistors and custom resistors above. Typical design limits are:

Resistance tolerance to 0.01%
Resistance ratio to 0.001%
TCR absolute to ⩽10 ppm/°C
TCR tracking to ⩽1 ppm/°C
Networks on silicon, ceramic or sapphire

DIODES

SWITCHING DIODES

. . . designed for use in high-speed switching applications.

HIGH-SPEED SWITCHING DIODES ($T_A = 25^oC$)

Device Type	$V_{(BR)}$ @ $I_{(BR)} = 100\ \mu A$ Volts Min	I_R μA Max	@ V_R Volts	I_R nA Max	@ V_R Volts	V_F @ $I_F = 10$ mA Min/Max	C @ $V_R = 0$ pF Max
MMCD914 ①	100	5.0	75	25	20	–/1.0	4.0
MMCD6100 ②	100	5.0	100	100	50	0.65/0.85	1.5

① Reverse recovery time = 5.0 ns @ $I_F = 10$ mA, $V_R = 6.0$ V, $i_{rr} = 1.0$ mA

② Reverse recovery time = 5.0 ns @ $I_F = I_R = 10$ mA, $V_R = 5.0$ V, $i_{rr} = 1.0$ mA

ZENER DIODE CHIPS

. . . for use in compact and high performance circuits that are beyond the present state of monolithic production capability.

SILICON ZENER DIODE CHIPS (T_A = 25°C unless otherwise noted)

V_F = 1.5 V Max @ I_F = 200 mA for all types.

Type Number (Note 1)	Nearest 1N Equivalent	Nominal Zener Voltage V_Z @ I_{ZT} = 250 μA Volts (Note 1)	Max Zener Impedance Z_{ZT} @ I_{ZT} = 250 μA Ohms	Max Reverse Leakage Current		
				I_R μA	@ V_R Volts	
					Tolerance	
					10%	5.0%
MZC1.8B10	1N4614	1.8	1200	7.5	0.9	1.0
MZC2.0B10	1N4615	2.0	1250	5.0	0.9	1.0
MZC2.2B10	1N4616	2.2	1300	4.0	0.9	1.0
MZC2.4B10	1N4617	2.4	1400	2.0	0.9	1.0
MZC2.7B10	1N4618	2.7	1500	1.0	0.9	1.0
MZC3.0B10	1N4619	3.0	1600	0.8	0.9	1.0
MZC3.3B10	1N4620	3.3	1650	7.5	1.0	1.5
MZC3.6B10	1N4621	3.6	1700	7.5	1.5	2.0
MZC3.9B10	1N4622	3.9	1650	5.0	1.5	2.0
MZC4.3B10	1N4623	4.3	1600	4.0	1.5	2.0
MZC4.7B10	1N4624	4.7	1550	10	2.5	3.0
MZC5.1B10	1N4625	5.1	1500	10	2.5	3.0
MZC5.6B10	1N4626	5.6	1400	10	3.5	4.0
MZC6.2B10	1N4627	6.2	1200	10	4.5	5.0
MZC6.8B10	1N4099	6.8	200	10	4.8	5.2
MZC7.5B10	1N4100	7.5	200	10	5.5	5.7
MZC8.2B10	1N4101	8.2	200	1.0	6.0	6.3
MZC8.7B10	1N4102	8.7	200	1.0	6.2	6.6
MZC9.1B10	1N4103	9.1	300	1.0	6.7	6.9
MZC10B10	1N4104	10	400	1.0	7.0	7.6
MZC11B10	1N4105	11	400	0.05	8.0	8.5
MZC12B10	1N4106	12	300	0.05	8.7	9.1
MZC13B10	1N4107	13	200	0.05	9.4	9.9
MZC14B10	1N4108	14	200	0.05	9.5	10.7
MZC15B10	1N4109	15	200	0.05	10.5	11.4
MZC16B10	1N4110	16	200	0.05	11.4	12.2
MZC17B10	1N4111	17	200	0.05	12.4	12.9
MZC18B10	1N4112	18	200	0.05	13.3	13.7
MZC19B10	1N4113	19	200	0.05	13.3	14.5
MZC20B10	1N4114	20	200	0.01	14.3	15.2
MZC22B10	1N4115	22	200	0.01	16.2	16.7
MZC24B10	1N4116	24	200	0.01	17.1	18.5
MZC25B10	1N4117	25	200	0.01	18.1	19.0
MZC27B10	1N4118	27	200	0.01	20	20.5
MZC28B10	1N4119	28	200	0.01	20	21.3
MZC30B10	1N4120	30	200	0.01	22	22.6
MZC33B10	1N4121	33	200	0.01	24	25.1
MZC36B10	1N4122	36	200	0.01	26	27.4
MZC39B10	1N4123	39	200	0.01	29	29.7
MZC43B10	1N4124	43	250	0.01	31	32.7
MZC47B10	1N4125	47	250	0.01	34	35.8
MZC51B10	1N4126	51	300	0.01	37	38.8
MZC56B10	1N4127	56	300	0.01	41	42.6
MZC60B10	1N4128	60	300	0.01	44	45.6
MZC62B10	1N4129	62	300	0.01	45	47.1
MZC68B10	1N4130	68	400	0.01	49	51.7
MZC75B10	1N4131	75	500	0.01	53	57.0
MZC82B10	1N4132	82	600	0.01	59	62.3
MZC87B10	1N4133	87	700	0.01	65	66.1
MZC91B10	1N4134	91	800	0.01	66	69.2
MZC100B10	1N4135	100	1000	0.01	72	76.0
MZC110B10	–	110	1300	0.01	80	84.0
MZC120B10	–	120	1600	0.01	86	91.0
MZC130B10	–	130	1900	0.01	94	99.0
MZC140B10	–	140	2200	0.01	101	106
MZC150B10	–	150	2600	0.01	108	114
MZC160B10	–	160	3000	0.01	116	122
MZC170B10	–	170	3500	0.01	123	129
MZC180B10	–	180	4000	0.01	130	137
MZC190B10	–	190	4600	0.01	137	144
MZC200B10	–	200	5200	0.01	144	152

NOTE 1 – Tolerance and Voltage Designation

Tolerance Designation – The device type numbers listed have a tolerance of ±10%. For a ±5%, 3%, 2%, or 1%, change the suffix "10" to the desired tolerance.

Voltage Designation – To order devices with Zener voltages other than those listed. See ordering information on page 6-31.

NOTE 2

The MZC2.4A10 Series is tested at a 50 Milliwatt dissipation level and not at the higher test currents of the nearest "1N" equivalents. This procedure is used to minimize correlation problems encountered when probe testing. Zener voltage is guaranteed correlated when the die is mounted on a 1" x 1" x 0.010" aluminum heat sink at T_A = 30°C ±1°C after 90 seconds.

ZENER CHIPS (continued)

SILICON ZENER DIODE CHIPS ($T_A = 25^\circ C$ unless otherwise noted)

$V_F = 1.5$ V Max @ $I_F = 200$ mA for all types.

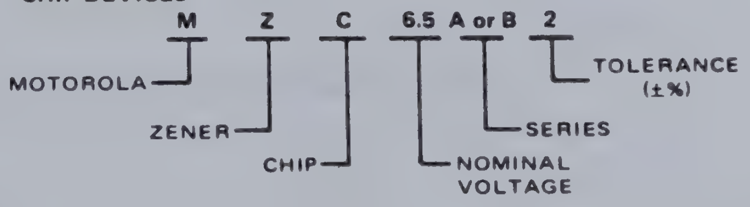
Type Number (Note 1)	Nearest 1N Equivalent (Note 2)	Nominal Zener Voltage V_Z @ I_{ZT} Volts (Note 1)	Test Current I_{ZT} mA (Note 2)	Max Zener Impedance Z_{ZT} @ I_{ZT} Ohms	Max Reverse Leakage Current I_R µA	@ V_R Volts Tolerance 10%	@ V_R Volts Tolerance 5.0%	Max Zener Voltage Temp. Coeff. θ_{VZ} (%/°C) (For Reference Only)
MZC2.4A10	1N5221, 1N4370	2.4	21	53	100	0.95	1.0	-0.085
MZC2.5A10	1N5222	2.5	20	53	100	0.95	1.0	-0.085
MZC2.7A10	1N5223, 1N4371	2.7	19	52	75	0.95	1.0	-0.080
MZC2.8A10	1N5224	2.8	18	51	75	0.95	1.0	-0.080
MZC3.0A10	1N5225, 1N4372	3.0	17	50	50	0.95	1.0	-0.075
MZC3.3A10	1N5226, 1N746	3.3	15	47	25	0.95	1.0	-0.070
MZC3.6A10	1N5227, 1N747	3.6	14	43	15	0.95	1.0	-0.065
MZC3.9A10	1N5228, 1N748	3.9	13	35	10	0.95	1.0	-0.060
MZC4.3A10	1N5229, 1N749	4.3	12	29	5.0	0.95	1.0	±0.055
MZC4.7A10	1N5230, 1N750	4.7	11	24	5.0	1.9	2.0	±0.030
MZC5.1A10	1N5231, 1N751	5.1	9.8	21	5.0	1.9	2.0	±0.030
MZC5.6A10	1N5232, 1N752	5.6	8.9	25	5.0	2.9	3.0	+0.038
MZC6.0A10	1N5233	6.0	8.3	30	5.0	3.3	3.5	+0.038
MZC6.2A10	1N5234, 1N753	6.2	8.1	31	5.0	3.8	4.0	+0.045
MZC6.8A10	1N5235, 1N754	6.8	7.3	38	3.0	4.8	5.0	+0.050
MZC7.5A10	1N5236, 1N755	7.5	6.7	43	3.0	5.7	6.0	+0.058
MZC8.2A10	1N5237, 1N756	8.2	6.1	49	3.0	6.2	6.5	+0.062
MZC8.7A10	1N5238	8.7	5.7	52	3.0	6.2	6.5	+0.065
MZC9.1A10	1N5239, 1N757	9.1	5.5	54	3.0	6.7	7.0	+0.068
MZC 10A10	1N5240, 1N758	10	5.0	60	3.0	7.6	8.0	+0.075
MZC 11A10	1N5241, 1N962	11	4.5	66	2.0	8.0	8.4	+0.076
MZC 12A10	1N5242, 1N759	12	4.2	71	1.0	8.7	9.1	+0.077
MZC 13A10	1N5243, 1N964	13	3.8	74	0.5	9.4	9.9	+0.079
MZC 14A10	1N5244	14	3.6	33	0.1	9.5	10	+0.082
MZC 15A10	1N5245, 1N965	15	3.3	37	0.1	10.5	11	+0.082
MZC 16A10	1N5246, 1N966	16	3.1	42	0.1	11.4	12	+0.083
MZC 17A10	1N5247	17	2.9	47	0.1	12.4	13	+0.084
MZC 18A10	1N5248, 1N967	18	2.8	52	0.1	13.3	14	+0.085
MZC 19A10	1N5249	19	2.6	58	0.1	13.3	14	+0.086
MZC 20A10	1N5250, 1N968	20	2.5	65	0.1	14.3	15	+0.086
MZC 22A10	1N5251, 1N969	22	2.3	70	0.1	16.2	17	+0.087
MZC 24A10	1N5252, 1N970	24	2.1	92	0.1	17.1	18	+0.088
MZC 25A10	1N5253	25	2.0	100	0.1	18.1	19	+0.089
MZC 27A10	1N5254, 1N971	27	1.9	115	0.1	20	21	+0.090
MZC 28A10	1N5255	28	1.8	120	0.1	20	21	+0.091
MZC 30A10	1N5256, 1N972	30	1.7	140	0.1	22	23	+0.091
MZC 33A10	1N5257, 1N973	33	1.5	170	0.1	24	25	+0.092
MZC 36A10	1N5258, 1N974	36	1.4	200	0.1	26	27	+0.093
MZC 39A10	1N5259, 1N975	39	1.3	230	0.1	29	30	+0.094
MZC 43A10	1N5260, 1N976	43	1.2	280	0.1	31	33	+0.095
MZC 47A10	1N5261, 1N977	47	1.1	330	0.1	34	36	+0.095
MZC 51A10	1N5262, 1N978	51	0.98	390	0.1	37	39	+0.096
MZC 56A10	1N5263, 1N979	56	0.89	460	0.1	41	43	+0.096
MZC 60A10	1N5264	60	0.83	530	0.1	44	46	+0.097
MZC 62A10	1N5265, 1N980	62	0.81	560	0.1	45	47	+0.097
MZC 68A10	1N5266, 1N981	68	0.74	680	0.1	49	52	+0.097
MZC 75A10	1N5267, 1N982	75	0.67	800	0.1	53	56	+0.098
MZC 82A10	1N5268, 1N983	82	0.61	980	0.1	59	62	+0.098
MZC 87A10	1N5269	87	0.57	1050	0.1	65	68	+0.099
MZC 91A10	1N5270, 1N984	91	0.55	1150	0.1	66	69	+0.099
MZC100A10	1N5271, 1N985	100	0.50	1400	0.1	72	76	+0.110
MZC110A10	1N5272, 1N986	110	0.45	1700	0.1	80	84	+0.110
MZC120A10	1N5273, 1N987	120	0.42	2000	0.1	86	91	+0.110
MZC130A10	1N5274, 1N988	130	0.38	2300	0.1	94	99	+0.110
MZC140A10	1N5275	140	0.36	2700	0.1	101	106	+0.110
MZC150A10	1N5276, 1N989	150	0.33	3000	0.1	108	114	+0.110
MZC160A10	1N5277, 1N990	160	0.31	3400	0.1	116	122	+0.110
MZC170A10	1N5278	170	0.29	3900	0.1	123	129	+0.110
MZC180A10	1N5279, 1N991	180	0.28	4300	0.1	130	137	+0.110
MZC190A10	1N5280	190	0.26	4800	0.1	137	144	+0.110
MZC200A10	1N5281, 1N992	200	0.25	5200	0.1	144	152	+0.110

ORDERING INFORMATION

Voltage Designation — To order devices with Zener voltages other than those listed, the Motorola type number should be modified as shown.

For notes 1 and 2 see page 6-30

CHIP DEVICES



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MECL 10,000 SERIES
INTEGRATED CIRCUITS

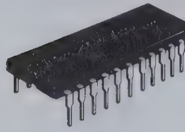
MC10,000/10,200 Series (-30 to +85°C)
MC10,500/10,600 Series (-55 to +125°C)

MECL 10,000* is Motorola's fourth family of emitter-coupled logic. Like MECL I*, II*, and III*, this family provides non-saturated switching for very high speed operation. The MECL 10,000 family is designed to fill the speed range between 4.0 ns MECL II and 1.0 ns MECL III.

The features of MECL II and MECL III have been optimized and combined to give MECL 10,000 an excellent speed-power product, relatively slow rise and fall times, and transmission-line drive capability. The combination of versatile logic functions and the 2.0 ns propagation delay make MECL 10,000 the optimum family for data handling and processing systems.

Circuit design with MECL 10,000 is similar to that for the MECL II and MECL III lines. The differential amplifier input and emitter-follower output permit high fanout, the wired-OR option, and complementary outputs. MECL III is directly compatible with MECL 10,000, and can be used to extend the speed capability of the MECL 10,000 series.

*Trademark of Motorola Inc.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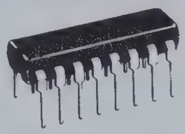
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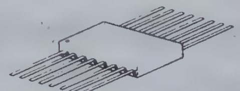
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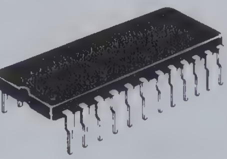
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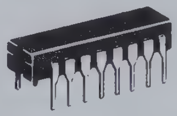
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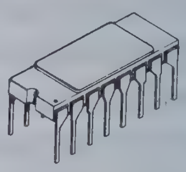

AL SUFFIX
CERAMIC PACKAGE
CASE 690

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 0, V_{EE} = -5.2 V, T_A = 25°C)

Function	Type ①		Propagation Delay ns typ	Power Dissipation mW typ/pkg*	Case
	-30 to +85°C	-55 to +125°C			
Quad OR/NOR Gate	MC10101	MC10501	2.0	100	620,648,650
Quad 2-Input NOR Gate	MC10102	MC10502	2.0	100	620,648,650
Quad 2-Input AND Gate	MC10104	–	2.7	140	620
Triple 2-3-2-Input OR/NOR Gate	MC10105	MC10505	2.0	90	620,648,650
Triple 4-3-3-Input NOR Gate	MC10106	MC10506	2.0	90	620
Triple 2-Input Exclusive OR/Exclusive NOR	MC10107	MC10507	2.5	110	620,650
Dual 4-5-Input OR/NOR Gate	MC10109	MC10509	2.0	60	620,648,650
Dual 3-Input 3-Output OR Gate	MC10110	–	2.4	160	620,648
Dual 3-Input 3-Output NOR Gate	MC10111	–	2.4	160	620
Triple Line Receiver	MC10114	–	2.4	145	620
Quad Line Receiver	MC10115	MC10515	2.0	110	620,648
Triple Line Receiver	MC10116	MC10516	2.0	85	620
Dual 2-Wide 2-3-Input OR-AND/OR-AND-INVERT Gate	MC10117	MC10517	2.3	100	620,648
Dual 2-Wide 3-Input OR-AND Gate	MC10118	MC10518	2.3	100	620
4-Wide 4-3-3-3-Input OR-AND Gate	MC10119	MC10519	2.3	100	620
4-Wide OR-AND/OR-AND-INVERT Gate	MC10121	MC10521	2.5	100	620
Triple 4-3-3-Input Bus Driver	MC10123	–	3.0	310	620
Quad MTTL to MECL Translator	MC10124	–	3.5	380	620
Quad MECL to MTTL Translator	MC10125	–	5.0	380	620
Dual MECL To MOS Translator	MC10127	–	–	–	620
Bus Driver	MC10128	–	12.0	700	620
Quad Bus Receiver	MC10129	–	10.0	750	620
Dual Latch	MC10130	–	2.5	155	620
Dual Type D Master-Slave Flip-Flop	MC10131	MC10531	f = 160 MHz	235	620,650
Dual Multiplexer With Latch and Common Reset	MC10132	–	3.0	225	620
Quad Latch	MC10133	–	4.0	310	620
Multiplexer with Latch	MC10134	–	3.0	225	620
Dual J-K Master-Slave Flip-Flop	MC10135	–	f = 140 MHz	280	620
Universal Hexadecimal Counter	MC10136	–	f = 150 MHz	625	620
Universal Decade Counter	MC10137	–	f = 150 MHz	625	620
Four-Bit Universal Shift Register	MC10141	–	f = 200 MHz	425	620
64-Bit Register File (RAM)	MC10145	–	t_{Access} = 10	625	620
12-Bit Parity Generator-Checker	MC10160	MC10560	5.0	320	620
Binary to 1-8 Decoder (Low)	MC10161	–	4.0	315	620
Binary to 1-8 Decoder (High)	MC10162	–	4.0	315	620
8-Line Multiplexer	MC10164	MC10564	3.0	310	620
8-Input Priority Encoder	MC10165	–	7.0	545	620
Dual Binary To 1-4 Decoder (Low)	MC10171	–	4.0	325	620
Dual Binary To 1-4 Decoder (High)	MC10172	–	4.0	325	620
Quad 2-Input Multiplexer/Latch	MC10173	–	2.5	275	620
Dual 4 To 1 Multiplexer	MC10174	–	3.5	305	620
Quint Latch	MC10175	–	2.5	400	620
Hex "D" Master-Slave Flip-Flop	MC10176	–	f = 150 MHz	460	620
Look-Ahead Carry Block	MC10179	–	3.0 ($\overline{C}n,\overline{P}$) 4.0 ($\overline{G}$)	300	620
Dual High Speed Adder/Subtractor	MC10180	–	4.5	360	620
4-Bit Arithmetic Logic Unit/Function Generator	MC10181	MC10581	See Logic Diag.	600	623,649
High Speed Dual 3-Input 3-Output OR Gate	MC10210	–	1.5	160	620
High Speed Dual 3-Input 3-Output NOR Gate	MC10211	–	1.5	160	620
High Speed Triple Line Receiver	MC10216	–	1.8	100	620
High Speed Dual Type D Master-Slave Flip-Flop	MC10231	MC10631	f = 225 MHz	270	620
64-Bit Random Access Memory (90 Ω)	MCM10140	–	t_{Access} = 10	420	690
64-Bit Random Access Memory (50 Ω)	MCM10148	–	t_{Access} = 10	420	690

① L suffix denotes Dual In-Line Ceramic Package, P suffix denotes Dual In-Line Plastic Package, F suffix denotes flat package (i.e., MC10100L = Ceramic Dual In-Line Package, MC10100P = Plastic Dual In-Line Package and MC10500F = Ceramic Flat Package.)

*Load Power not included

MECL

INTEGRATED CIRCUITS

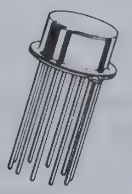
MECL

MC300 Series (−55° to +125°C)

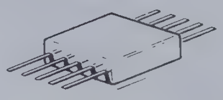
MC350 Series (0° to +75°C)

FEATURES

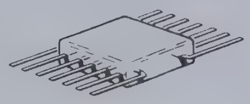
- Propagation delay typically 8 ns per logic decision
- Virtually constant noise immunity with ±20% power supply variation and over corresponding temperature range
- Simultaneous OR / NOR or AND / NAND outputs
- High fan-in and fan-out capabilities



G SUFFIX
METAL PACKAGE
CASE 602B



F SUFFIX
CERAMIC PACKAGE
CASE 606
TO-91



F SUFFIX
CERAMIC PACKAGE
CASE 607

The MECL MC300/350 series finds wide use in existing systems, and is being designed into a few new systems. However, for most new designs MECL 10,000 circuits are recommended.

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 0, V_{EE} = -5.2 V, T_A = 25°C)

Function	Type ①		Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg	Case
	-55 to +125°C	0 to +75°C				
5-Input OR/NOR Gate	MC301	MC351	25	7.5	37	602B,606
R-S Flip-Flop	MC302	MC352A	25	11	42	602B,606
Half-Adder	MC303	MC353	25	7.5	63	602B,606
Bias Driver	MC304	MC354	25	–	18	602B,606
5-Input Gate Expander	MC305	MC355	–	4.5	–	602B,606
3-Input OR/NOR Gate	MC306	MC356	25	7.5	37	602B,606
3-Input OR/NOR Gate	MC307	MC357	25	7.5	15	602B,606
AC-Coupled J-K Flip-Flop	MC308	MC358A	25	8.5	87	602B,606
Dual 2-Input NOR Gate	MC309	MC359	25	7.0	54	602B,606
Dual 2-Input NOR Gate	MC310	MC360	25	7.0	54	602B,606
Dual 2-Input NOR Gate	MC311	MC361	25	7.0	41	602B,606
Dual 3-Input NOR Gate (With Internal Bias)	MC312A	MC362A	25	7.5	70	602B,606
Quad 2-Input NOR Gate	MC313F	MC363F	25	7.0	125	607
AC-Coupled J-K Flip-Flop	MC314	MC364	25	12	118	602B, 606
Line Driver	MC315	MC365	–	14	180②– 270③	602B, 606
Lamp Driver	MC316	MC366	–	–	135	602B, 606
Level Translator – MECL to Saturated Logic	MC317	MC367	7 (DTL)	27.5	63	602B, 606
Level Translator – Saturated Logic to MECL	MC318	MC368	25 (MECL)	17	105	602B, 606
Dual 4-Input Clock Driver/High-Speed Gate	–	MC369F	100	3.0	250	607
Dual 2-Input Clock Driver/High-Speed Gate	–	MC369G	100	3.0	250	602B

① G suffix denotes Metal Can. F suffix denotes Flat Package. (i.e., MC301G = Metal Can, MC301F = Flat Package.)
② With 93-ohm load for MC315 (each side)
③ With 50-ohm load for MC365 (each side)

MECL II INTEGRATED CIRCUITS MECL II

MC1000 Series (0 to +75°C)
MC1200 Series (–55 to +125°C)

The MECL II* series of monolithic integrated logic circuits presents the system design engineer with an integrated circuit family designed to permit system implementation with few individual units. This approach offers cost savings, reduced power supply requirements, small physical size and high reliability.

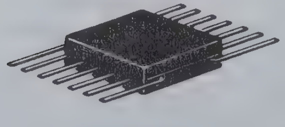
MECL II circuits feature fast propagation delay times with commensurate rise and fall times. These features plus the constant current characteristic of MECL impose few restrictions on design, layout, or system fabrication.

MECL II finds wide use in existing systems, and is being designed into a few new systems. However, for most new designs MECL 10,000* circuits are recommended.

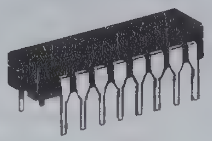
*Trademark of Motorola Inc.

FEATURES

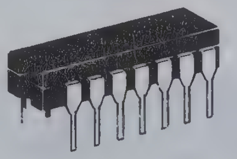
- Propagation typically 4 ns per logic decision
- Excellent noise immunity characteristics
- Simultaneous OR/NOR outputs
- High fan-in and fan-out capabilities
- Internally temperature compensated



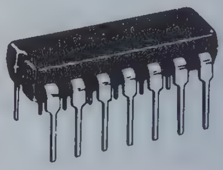
F SUFFIX
CERAMIC PACKAGE
CASE 607
TO-86



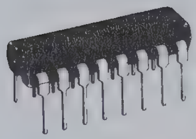
L SUFFIX
CERAMIC PACKAGE
CASE 620



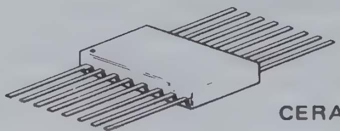
L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116



P SUFFIX
PLASTIC PACKAGE
CASE 646



P SUFFIX
PLASTIC PACKAGE
CASE 648



F SUFFIX
CERAMIC PACKAGE
CASE 650

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 0, V_{EE} = -5.2 V, T_A = 25°C)

Function	Type ①		Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg	Case
	-55 to + 125°C	0 to + 75°C				
Single 6-Input Gate, 3 OR Outputs w/Pulldowns 3 NOR Outputs w/Pulldowns	MC1201F,L	MC1001P	25	4.0	115	607, 632, 646
Single 6-Input Gate, 3 OR Outputs w/Pulldowns 3 NOR Outputs w/o Pulldowns	MC1202L†	MC1002P†	25	4.0	80	632, 646
Single 6-Input Gate, 3 OR Outputs w/o Pulldowns 3 NOR Outputs w/o Pulldowns	MC1203L†	MC1003P†	25	4.0	40	632, 646
Dual 4-Input Gate, 2 OR Outputs w/Pulldowns 2 NOR Outputs w/Pulldowns	MC1204F,L	MC1004P	25	4.0	95	607, 632, 646
Dual 4-Input Gate, 2 OR Outputs w/Pulldowns 2 NOR Outputs w/o Pulldowns	MC1205L†	MC1005P†	25	4.0	65	632, 646
Dual 4-Input Gate, 2 OR Outputs w/o Pulldowns 2 NOR Outputs w/o Pulldowns	MC1206F,L	MC1006P	25	4.0	45	607, 632, 646
Triple 3-Input Gate, 3 NOR Outputs w/Pulldowns	MC1207F,L	MC1007P	25	4.0	110	607, 632, 646
Triple 3-Input Gate, 1 NOR Outputs w/Pulldowns 2 NOR Outputs w/o Pulldowns	MC1208L†	MC1008P†	25	4.0	75	632, 646
Triple 3-Input Gate, 3 NOR Outputs w/o Pulldowns	MC1209L†	MC1009P†	25	4.0	60	632, 646
Quad 2-Input Gate, 4 NOR Outputs w/Pulldowns	MC1210F,L	MC1010P	25	4.5	115	607, 632, 646
Quad 2-Input Gate, 2 NOR Outputs w/Pulldowns 2 NOR Outputs w/o Pulldowns	MC1211F,L	MC1011P	25	4.5	95	607, 632, 646

① Type numbers with F suffix use Case 607 or 650, Type numbers with L suffix use Case 632 or 620 as indicated. Type numbers with P suffix use Case 646 or 648 as indicated.

†Not recommended for new designs

MECL II INTEGRATED CIRCUITS (continued)

FUNCTIONS AND CHARACTERISTICS ($V_{CC} = 0$, $V_{EE} = -5.2$ V, $T_A = 25^oC$)

Function	Type ①		Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg	Case
	-55 to + 125°C	0 to + 75°C				
Quad 2-Input Gate, 4 NOR Outputs w/o Pulldowns	MC1212F,L	MC1012P	25	4.5	65	607, 632, 646
AC Coupled J-K Flip-Flop (85 MHz typ)	MC1213F,L	MC1013P	25	6.0	125	607, 632, 646
Dual R-S Flip-Flop (Positive Clock)	MC1214F,L	MC1014P	25	6.0	140	607, 632, 646
Dual R-S Flip-Flop (Negative Clock)	MC1215F,L	MC1015P	25	6.0	140	607, 632, 646
Dual R-S Flip-Flop (Single Rail)	MC1216F,L	MC1016P	25	6.0	140	607, 632, 646
Level Translator (Saturated Logic to MECL)	MC1217F,L	MC1017P	25 (MECL)	15	105	607, 632, 646
Level Translator (MECL to Saturated Logic)	MC1218F,L	MC1018P	7 (DTL)	19	55	607, 632, 646
Full Adder	MC1219F,L	MC1019P	25	3.0 to 8.0**	145	607, 632, 646
Quad Line Receiver	MC1220F,L	MC1020P	25	4.0	115	607, 632, 646
Full Subtractor	MC1221F,L	MC1021P	25	4.0 to 11**	145	607, 632, 646
Type D Flip-Flop	MC1222F,L	MC1022P	25	8.0	110	607, 632, 646
Dual 4-Input OR/NOR Clock Driver *	MC1223F,L	MC1023P	25	2.0	250	607, 632, 646
Dual 2-Input Expandable Gate	MC1224L	MC1024P	25	4.0	95	632, 646
Dual 4 and 5-Input Expander	MC1225F,L	MC1025P	–	–	–	607, 632, 646
Dual 3-4-Input Transmission Line and Clock Driver *	MC1226F,L	MC1026P	25	2.0	140	607, 632, 646
AC Coupled J-K Flip-Flop (120 MHz typ)	MC1227F,L	MC1027P	25	4.0	250	607, 632, 646
Dual 4-Channel Data Selector *	MC1228F,L	MC1028P	25	5.0	170	620, 648, 650
Data Distributor	MC1229F,L	MC1029P	25	4.0	160	607, 632, 646
Quad Exclusive OR Gate	MC1230F,L	MC1030P	25	5.0	130	607, 632, 646
Quad Exclusive NOR Gate	MC1231F,L	MC1031P	25	5.0	130	607, 632, 646
100-MHz AC Coupled Dual J-K Flip-Flop *	MC1232F,L	MC1032P	25	4.5	180	620, 648, 650
Dual R-S Flip-Flop (Single Rail, Negative Clock)	MC1233F,L	MC1033P	25	6.0	140	607, 632, 646
Type D Flip-Flop *	MC1234F,L	MC1034P	25	4.0	185	607, 632, 646
Triple Line Receiver	MC1235F,L	MC1035P	25	5.0	140	607, 632, 646
16-Bit Coincident Memory *	MC1236F,L	MC1036P	5	17	250	607, 632, 646
16-Bit Coincident Memory w/o Pulldowns *	MC1237F,L	MC1037P	5	17	250	607, 632, 646
8-Channel Data Selector *	MC1238L†	MC1038P†	25	7.0 to 18**	150	632, 646
Quad Level Translator (MECL to Saturated Logic)	MC1239F,L	MC1039P	7 (DTL)	12	200	620, 648, 650
Quad Latch	MC1240F,L	MC1040P	25	8.0	250	607, 632, 646
Dual Binary to One-Of-Four Decoder *	MC1242L†	MC1042P†	25	6.5	245	620, 648
3-Bit Binary to One-Of-Eight Line Decoder *	MC1243L†	MC1043P†	25	6.0 to 11**	210	632, 646
Binary to One-Of-Ten Line Decoder *	MC1244L†	MC1044P†	25	6.0	245	620, 648
Decoder - Display Driver *	MC1245F,L	MC1045P	–	–	178	620, 648, 650
Quad 2-Input AND Gates	MC1247F,L	MC1047P	25	5.0	130	607, 632, 646
Quad 2-Input NAND Gates	MC1248F,L	MC1048P	25	5.0	130	607, 632, 646
Dual Full Adder *	MC1259F,L	MC1059P	25	9.0	375	620, 648, 650
Quad 2-Input NOR Gate *	MC1262F,L	MC1062P	25	2.0	320	620, 648, 650
Quad 2-Input NOR Gate *	MC1263L	MC1063P	25	2.0	320	632, 646
Triple Line Receiver *	MC1266F,L	MC1066P	25	2.0	350	607, 632, 646
Quad MTTL to MECL Translator With Strobe	MC1267F,L	MC1067P	1	5.0	300	620, 648, 650
Quad MECL to MTTL Translator With Totem-Pole Outputs *	MC1268F,L	MC1068P	10 (MTTL)	5.0	340	620, 648, 650
Quad Latch	MC1270F,L	MC1070P	25	8.0	200	607, 632, 646

① Type numbers with F suffix use Case 607 or 650, Type numbers with L suffix use Case 632 or 620 as indicated.
Type numbers with P suffix use Case 646 or 648 as indicated.

†Not recommended for new designs

*Noise Margin = 150 mV

**Propagation delay time is dependent on data path, see data sheet for details.

MECL III INTEGRATED CIRCUITS MECL III

MC1600 Series (0 to +75°C)

The requirement for digital systems with ever higher performance has increased the need for high-speed integrated circuits. The industry has recognized that the only economical way to obtain high operating system speed is through the use of emitter-coupled logic. As the result of considerable effort in research and development, Motorola offers a state-of-the-art, emitter-coupled logic family with sub-nanosecond local propagation delays – MECL III .

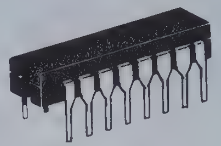
MECL III circuit design is similar to that used in the popular MECL II and MECL 10,000 families. In the MECL III line, as well as MECL 10,000, more advanced processing techniques are employed and the capability of driving low-impedance terminated lines is provided.

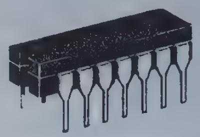
GENERAL FEATURES

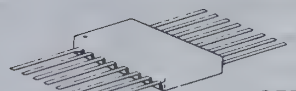
- Gate Switching Speeds of 1.0 ns
- Capability of Driving Terminated Lines with Impedance as Low as 50 Ohms
- Flip-Flop Toggle and Shifting Rate Greater Than 300 MHz
- Operation with Unused Inputs Left Open
- Multilayer Metalization for Optimum Performance
- New Packages with Improved Electrical and Thermal Characteristics
- Compatibility with MECL II and MECL 10,000 Series

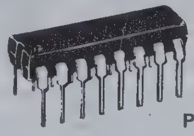
P SUFFIX
PLASTIC PACKAGE
CASE 646

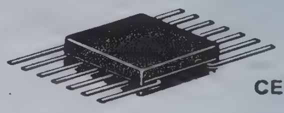
S SUFFIX
CERAMIC PACKAGE
CASE 617


L SUFFIX
CERAMIC PACKAGE
CASE 620


L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116


F SUFFIX
CERAMIC PACKAGE
CASE 650


P SUFFIX
PLASTIC PACKAGE
CASE 648


F SUFFIX
CERAMIC PACKAGE
CASE 607

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 0, V_{EE} = -5.2 V, T_A = 25° unless otherwise noted)

Function	Type①	Loading Factor# Each Output		Propagation Delay 50-ohm Load	Power Dissipation (No Load) mW	Case
	0 to +75°C	High Z	Low Z	ns typ	typ/pkg	
Voltage Controlled Oscillator	MC1648†	–	–	*225 MHz typ	150	607,632,646
Dual A/D Comparator	MC1650	70	7	3.5	275	617,620
Dual A/D Comparator	MC1651	70	7	2.5	275	617,620
Binary Counter (High Z)	MC1654	70	7	*325 MHz typ	750 ⊔⊔	620
Voltage-Controlled Multivibrator	MC1658†	70	7	*150 MHz typ	125	620,648,650
Dual 4-Input OR/NOR Gate (High Z)	MC1660†	70	7	1.1	120	617,620,650
Dual 4-Input OR/NOR Gate (Low Z)	MC1661	70	7	1.1	120	617,620
Quad 2-Input NOR Gate (High Z)	MC1662†	70	7	1.1	240	617,620,650
Quad 2-Input NOR Gate (Low Z)	MC1663	70	7	1.1	240	617,620
Quad 2-Input OR Gate (High Z)	MC1664†	70	7	1.1	240	617,620,650
Quad 2-Input OR Gate (Low Z)	MC1665	70	7	1.1	240	617,620
Dual Clocked R-S Flip-Flop (High Z)	MC1666†	70	7	1.8	220	617,620,650
Dual Clocked R-S Flip-Flop (Low Z)	MC1667	70	7	1.8	230	617,620
Dual Clocked Latch (High Z)	MC1668†	70	7	1.8	220	617,620,650
Dual Clocked Latch (Low Z)	MC1669	70	7	1.8	220	617,620
Master-Slave Type D Flip-Flop (High Z)	MC1670†	70	7	*350 MHz typ	220	617,620,650
Master-Slave Type D Flip-Flop (Low Z)	MC1671	70	7	*350 MHz typ	220	617,620
Triple 2-Input Exclusive OR Gate (High Z)	MC1672†	70	7	1.3	220	617,620,650
Triple 2-Input Exclusive OR Gate (Low Z)	MC1673	70	7	1.3	250	617,620
Triple 2-Input Exclusive NOR Gate (High Z)	MC1674†	70	7	1.3	220	617,620,650
Triple 2-Input Exclusive NOR Gate (Low Z)	MC1675	70	7	1.3	250	617.620
Bi-Quinary Counter (High Z)	MC1678	70	7	*350 MHz typ	750 ⊔⊔	620
Bi-Quinary Counter (Low Z)	MC1679	70	7	*350 MHz typ	750 ⊔⊔	620
Random Access Memory (RAM) Cell (High Z)	MC1680	70	7	Read Delay 2.5 Write Delay 3.5	270	620
Content Addressable Memory (CAM) Cell (High Z)	MC1682	70	7	Search Delay 2.8 Write Delay 4.0	270	620
Content Addressable Random Access (CARAM) Memory Cell (High Z)	MC1684	70	7	Read Delay 2.5 Search Delay 2.8 Write Delay 4.0	270	620
UHF Prescaler Type D Flip-Flop	MC1690†	70	7	*500 MHz Min	200	617,620,650
Quad Line Receiver	MC1692†	70	7	1.1	220	617,620,650
4-Bit Shift Register (High Z)	MC1694	70	7	*325 MHz typ	750 ⊔⊔	620

① L suffix denotes Dual In-Line Ceramic Package, S suffix denotes Ceramic Flat Package with a stud, P suffix denotes Dual In-Line Plastic Package. (i.e., MC1600L = Ceramic Dual In-Line Package, MC1600S = Ceramic Flat Package with a stud, MC1600P = Plastic Dual In-Line Package). ⊔⊔ Requires Heat Sink – IERC LIC - 214A2WCB or equivalent

*Toggle Frequency

†These MECL III part types are available in the flat package upon request.

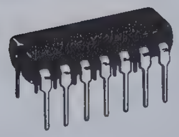
#DC Loading Factors are based on:
1. Full load output current, I_L = -25 mAdc max
2. Maximum input current, I_{in} = 350 μAdc (High Z)
3.1 mAdc (Low Z)

INTEGRATED CIRCUITS

***MC660 Series (-30 to +75°C)**

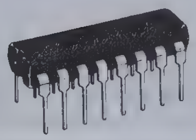
Motorola's MHTL integrated circuits are especially designed to meet the requirements of industrial applications because of the outstanding noise immunity. MHTL circuits provide error-free operation in high noise environments far beyond the tolerance of other integrated circuit families. Multifunction packages and broad operating temperature range further tailor this device family to the industrial designer's requirements.

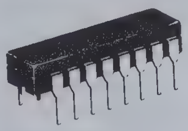
*MHTL cermaic dual in-line devices are available with specification over the –55°C to +125°C temperature range and/or with hi-rel processing on special order. See your Motorola representative for pricing.



P SUFFIX
PLASTIC PACKAGE
CASE 646

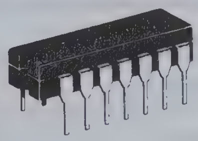
P SUFFIX
PLASTIC PACKAGE
CASE 648





L SUFFIX
CERAMIC PACKAGE
CASE 620

L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116



FUNCTIONS AND CHARACTERISTICS (V_{CC} = 15 V ± 1.0 Vdc, T_A = 25°C)

Function	Type ① -30 to +75°C	Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg	Case
Expandable Dual 4-Input Gate (active pullup)	MC660	10	110	88/26 ②	632,646
Expandable Dual 4-Input Gate (passive pullup)	MC661	10	125	88/26 ②	632,646
Expandable Dual 4-Input Line Driver	MC662	30	140	180/26 ②	632,646
Dual J-K Flip-Flop	MC663	9	3.0 MHz③	200	632,646
Master-Slave R-S Flip-Flop	MC664	8	3.0 MHz③	160	632,646
Triple Level Translator	MC665	MDTL = 8 MTTL III = 5.5 MRTL = 5	40	83 (MDTL) 104 (MRTL)	632,646
Triple Level Translator	MC666	10	75	105	632,646
Dual Monostable Multivibrator	MC667	10	140	240	632,646
Quad 2-Input Gate (passive pullup)	MC668	10	125	176/52②	632,646
Dual 4-Input Expander	MC669	–	–	–	632,646
Triple 3-Input Gate (passive pullup)	MC670	10	125	132/39②	632,646
Triple 3-Input Gate (active pullup)	MC671	10	110	132/39②	632,646
Quad 2-Input Gate (active pullup)	MC672	10	110	176/52②	632,646
Dual 2-Input AND-OR-INVERT Gate	MC673	10	110	160/50②	632,646
Dual 2-Input AND-OR-INVERT Gate	MC674	10	125	160/50②	632,646
Dual Pulse Stretcher	MC675	10	150 (pins 1,6) 110 (pins 5,6)	180	632,646
BCD-To-Decimal Decoder-Driver	MC676	–	–	380	620,648
Hex Inverter With Strobe (active pullup)	MC677	10	110	246/96②	620,648
Hex Inverter With Strobe (without output resistors)	MC678	10	125	192/96②	620,648
Dual Lamp Driver	MC679,B	125	0.5 μs typ	250/30②	632,646
Hex Inverter	MC680	10	110	246/96②	632,646
Hex Inverter (open collector)	MC681	10	125	192/96②	632,646
Quad Latch	MC682	10	250	375	620,648
Quad 2-Input Exclusive OR	MC683	10	–	380	632,646
Decade Counter	MC684	10	0.5 MHz③	480	620,648
Binary Counter	MC685	10	0.5 MHz③	480	620,648
4-Bit Shift Register	MC686	10	0.5 MHz③	480	620,648
Dual J-K Flip-Flop	MC688	10	2.5 MHz③	375	620,648
Hex Inverter (high voltage)	MC689	10	150	173/55②	632,646
Hex Inverter (active pullup)	MC690	10	150	173/55②	632,646
Dual Line Driver/Receiver	MC696	10 @ 10 V V_{CC} 15 @ 25 V V_{CC}	750	225/60 ②	620,648

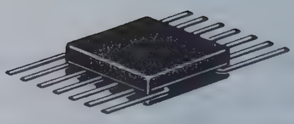
① L suffix denotes Dual In-Line Ceramic Package, P denotes Dual In-Line Plastic Package (i.e., MC660L = Dual In-Line Ceramic, MC660P = Dual In-Line Plastic Package)

② Inputs High/Input Low ③ f_{Tog}

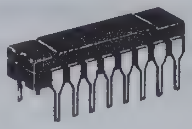
MC5400/MC7400 SERIES INTEGRATED CIRCUITS

MC5400 Series (–55 to +125°C)
MC7400 Series (0 to +75°C)

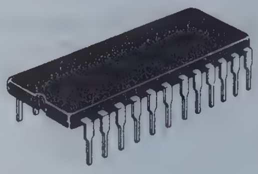
MC5400/MC7400 series integrated circuits comprise a family of transistor-transistor logic designed for general purpose digital applications. The family has a medium operating speed (15-30 MHz clock rate), good external noise immunity, high fan out, and the capability of driving capacitive loads of up to 600 pF.



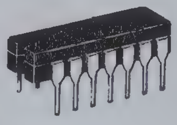
F SUFFIX
CERAMIC PACKAGE
CASE 607



L SUFFIX
CERAMIC PACKAGE
CASE 620



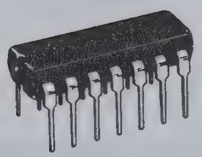
L SUFFIX
CERAMIC PACKAGE
CASE 623



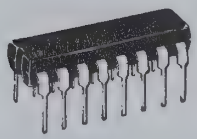
L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116

MAXIMUM RATINGS

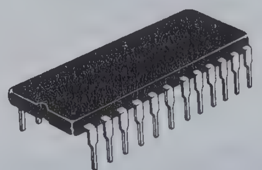
Rating	Value	Unit
Power Supply Voltage	7.0	Vdc
Input Voltage	5.5	Vdc
Operating Temperature Range MC5400 MC7400	-55 to +125 0 to +75	°C
Storage Temperature Range – Ceramic Plastic	-65 to +150 -55 to +125	°C



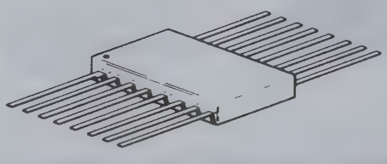
P SUFFIX
PLASTIC PACKAGE
CASE 646



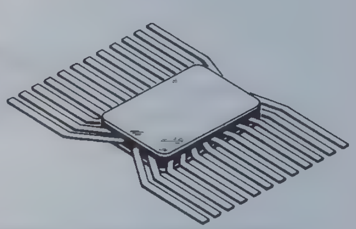
P SUFFIX
PLASTIC PACKAGE
CASE 648



P SUFFIX
PLASTIC PACKAGE
CASE 649



F SUFFIX
CERAMIC PACKAGE
CASE 650



F SUFFIX
CERAMIC PACKAGE
CASE 667

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Function	Type ①				Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
Quad 2-Input NAND Gate	MC5400F,L	607,632	MC7400F,L,P	607,632,646	10	10	40
Quad 2-Input NAND Gate (Open Collector)	MC5401F,L	607,632	MC7401F,L,P	607,632,646	10	35	40
Quad 2-Input NOR Gate	MC5402F,L	607,632	MC7402F,L,P	607,632,646	10	10	40
Quad 2-Input NAND Gate (Open Collector)	MC5403L	632	MC7403L,P	632,646	10	35	40
Hex Inverter	MC5404F,L	607,632	MC7404F,L,P	607,632,646	10	13	60
Hex Inverter	MC5405L	632	MC7405L,P	632,646	10	35	60
Hex Inverter Buffer/Driver (Open Collector)	MC5406L	632	MC7406L,P	632,646	10	15	105
Hex Buffer/Driver (Open Collector)	MC5407L	632	MC7407L,P	632,646	10	14	145
Quad 2-Input AND Gate	MC5408L	632	MC7408L,P	632,646	10	15	70
Quad 2-Input AND Gate (Open Collector)	MC5409L	632	MC7409L,P	632,646	10	15	70
Triple 3-Input NAND Gate	MC5410F,L	607,632	MC7410F,L,P	607,632,646	10	10	30
Hex Inverter Buffer/Driver (Open Collector)	MC5416L	632	MC7416L,P	632,646	10	15	105
Hex Buffer/Driver	MC5417L	632	MC7417L,P	632,646	10	14	145
Dual 4-Input NAND Gate	MC5420F,L	607,632	MC7420F,L,P	607,632,646	10	10	20
Quad 2-Input Interface NAND Gate	MC5426L	632	MC7426L,P	632,646	10	17	40
8-Input NAND Gate	MC5430F,L	607,632	MC7430F,L,P	607,632,646	10	10	10
Quad 2-Input Positive NAND Buffer	MC5437F,L	607,632	MC7437F,L,P	607,632,646	30	–	50
Quad 2-Input Positive NAND Buffer (Open Collector)	MC5438F,L	607,632	MC7438F,L,P	607,632,646	30	–	50
Dual 4-Input NAND Buffer	MC5440F,L	607,632	MC7440F,L,P	607,632,646	30	13	50

① F suffix denotes Flat Package. L suffix denotes Dual In-Line Ceramic Package. P suffix denotes Dual In-Line Plastic Package.

(continued)

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Function	Type ①				Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
BCD-to-Decimal Decoder and High-Level Driver	MC5441AL	620	MC7441AL,P	620,648	–	–	105
BCD-to-Decimal Decoder	MC5442L	620	MC7442L,P	620,648	10	22/23#	140
Excess Three-to-Decimal Decoder	MC5443L	620	MC7443L,P	620,648	10	22/23#	140
Excess Three Gray-to Decimal Decoder	MC5444L	620	MC7444L,P	620,648	10	22/23#	140
BCD to One-of-Ten Decoder/Driver	MC5445L	620	MC7445L,P	620,648	–	50 max	215
BCD-to-Seven Segment Decoder/Driver	MC5446L	620	MC7446L,P	620,648	BI/RBO 5	–	265
BCD-to-Seven Segment Decoder/Driver	MC5447L	620	MC7447L,P	620,648	BI/RBO 5	–	265
BCD-to-Seven Segemnt Decoder/Driver	MC5448L	620	MC7448L,P	620,648	BI/RBO = 5 a thru g = 4	–	265
BCD-to-Seven Segment Decoder/Driver	MC5449F	607	MC7449F	607	6	–	165
Expandable Dual 2-Wide 2-Input AND-OR-INVERT Gate	MC5450F,L	607,632	MC7450F,L,P	607,632,646	10	13	28
Dual 2-Wide 2-Input AND-OR-INVERT Gate	MC5451F,L	607,632	MC7451F,L,P	607,632,646	10	13	28
Expandable 4-Wide 2-Input AND-OR-INVERT Gate	MC5453F,L	607,632	MC7453F,L,P	607,632,646	10	13	22
4-Wide 2-Input AND-OR-INVERT Gate	MC5454F,L	607,632	MC7454F,L,P	607,632,646	10	13	22
Dual 4-Input Expander for AND-OR-INVERT Gates	MC5460F,L	607,632	MC7460F,L,P	607,632,646	–	5.0	8.0
J-K Flip-Flop	MC5470L	632	MC7470L,P	632,646	10	30	65
J-K Flip-Flop	MC5472F,L	607,632	MC7472F,L,P	607,632,646	10	30	40
Dual J-K Flip-Flop	MC5473F,L	607,632	MC7473F,L,P	607,632,646	10	30	80
Quad Latch	MC5475L	620	MC7475L,P	620,648	10	30	160
Dual J-K Flip-Flop	–	–	MC7476P	648	10	30	80
Quad Latch	MC5477F	607	MC7477F	607	10	30	160
Dual Type D Flip-Flop	MC5479F,L	607,632	MC7479F,L,P	607,632,646	10	16	84
Gated Full Adder	MC5480L	632	MC7480L,P	632,646	$S,\overline{S}$ = 10 $\overline{C_{out}}$ = 5 A★,B★, = 3	10/55*	105
2-Bit Full Adder	MC15482F,L	607,632	MC17482F,L,P	607,632,646	10	15/12*	165
2-Bit Full Adder	MC25482F,L	607,632	MC27482F,L,P	607,632,646	10	25/12*	165
4-Bit Binary Full Adder	MC5483L	620	MC7483L,P	620,648	S = 10 C_{out} = 5	35	390
16-Bit Scratch Pad Memory Cell With Gated Inputs	MC5484L	620	–	–	I_{OL} = 40 mA Open Collector	Write Mode 25	250
	–	–	MC7484L,P	620,648	I_{OL} = 20 mA	Sense Mode 15	
Decade Counter	MC5490F,L	607,632	MC7490F,L,P	607,632,646	10	20/bit	160
8-Bit Shift Register	MC5491AL	632	MC7491AL,P	632,646	10	25	175
Divide-by-Twelve Counter	MC5492F,L	607,632	MC7492F,L,P	607,632,646	10	60	160
4-Bit Binary Counter	MC5493F,L	607,632	MC7493F,L,P	607,632,646	10	20/bit	160
4-Bit Shift Register	MC5494L	620	MC7494L,P	620,648	–	25	175
4-Bit Shift Register	MC5495F,L	607,632	MC7495F,L,P	607,632,646	10	25	250
5-Bit Shift Register	MC5496F,L	650,620	MC7496F,L,P	650,620,648	–	25	240
Dual 4-Bit Latch	MC54100F,L	667,623	MC74100F,L,P	667,623,649	10	30	320
Dual J-K Flip-Flop	MC54107F,L	607,632	MC74107F,L,P	607,632,646	10	30	80
Monostable Multivibrator	MC54121F,L	607,632	MC74121F,L,P	607,632,646	10	t_{PLH} B to Q = 35	90
BCD to One-of-Ten Decoder/Driver	MC54145L	620	MC74145L,P	620,648	–	50 max	215
16-Channel Data Selector	MC54150L	623	MC74150L,P	623,649	–	8.5 to 35	200
8-Channel Data Selector	MC54151L	620	MC74151L,P	620,648	–	8.5 to 35	145

(continued)

① F suffix denotes Flat Package. L suffix denotes Dual In-Line Ceramic Package. P suffix denotes Dual In-Line Plastic Package.

*Add delay/Carry delay.

2 Logic Levels/3 Logic Levels.

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Function	Type ①				Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
8-Channel Data Selector/Multiplexer	MC54152F,L	607,632	MC74152F,L,P	607,632,646	10	8.5 to 35	130
Dual 4-Channel Data Selector/ Multiplexer	MC54153F,L	650,620	MC74153F,L,P	650,620,648	10	12 to 22	180
Dual 2-to-4 Line Decoder/ 1-to-4 Line Demultiplexer	MC54155F,L	650,620	MC74155F,L,P	650,620,648	10	2 Logic Levels = 16 3 Logic Levels = 21	125
Dual 2-to-4 Line Decoder/ 1-to-4 Line Demultiplexer	MC54156F,L	650,620	MC74156F,L,P	650,620,648	10	2 Logic Levels = 16 3 Logic Levels = 21	125
Quad 2-Input Data Selector/Multiplexer	MC54157F,L	650,620	MC74157F,L,P	650,620,648	10	40	150
8-Bit Parallel Out Serial Shift Register	MC54164AF,L	607,632	MC74164AF,L,P	607,632,646	5	f_{tog} = 36 MHz	185
8-Bit Odd/Even Generator/Checker	MC54180L	632	MC74180P	646	10	15 to 30	170
4-Bit Arithmetic Logic Unit/Function Generator	MC54181F,L	667,623	MC74181F,L,P	667,623,649	10	12 to 35	470
Look-Ahead Carry Generator	MC54182F,L	650,620	MC74182F,L,P	650,620,648	10	–	180
Presettable Decade Up/Down Counter	MC54192F,L	650,620	MC74192F,L,P	650,620,648	10	14 to 31	325
Presettable 4-Bit Binary Up/Down Counter	MC54193F,L	650,620	MC74913F,L,P	650,620,648	10	14 to 31	325
Binary to One-of-Eight Line Decoder	MC54406F,L	607,632	MC74406F,L,P	607,632,646	10	14	100
8-Bit Parity Tree	MC54408F,L	607,632	MC74408F,L,P	607,632,646	10	15 to 30	150
Programmable Modulo-N Decade Counter	MC54416L	620	MC74416L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Programmable Modulo-N Decade Counter	MC54417L	620	MC74417L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Programmable Modulo-N Hexadecimal Counter	MC54418L	620	MC74418L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Programmable Modulo-N Hexadecimal Counter	MC54419L	650,620	MC74450F,L,P	650,620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Counter Latch Decoder	MC54450F,L	650,620	MC74450F,L,P	650,620,648	Open Collector I_{OL} = 40 mA	f_{tog} = 40 MHz	450
Dual Decade Counter	MC54452F,L	650,620	MC74452F,L,P	650,620,648	10	f = 40MHz	350
Dual Hexadecimal Counter	MC54453F,L	650,620	MC74453F,L,P	650,620,648	10	f = 40MHz	350
Dual Decade Up/Down Counter	MC54454L	623	MC74454L,P	623,649	10	40	600
Dual Binary Up/Down Counter	MC54455L	623	MC74455L,P	623,649	10	40	600
NBCD Adder	MC54456F,L	650,620	MC74456F,L,P	650,620,648	10	30	300
Bus Transfer Switch	MC54460F,L	650,620	MC74460F,L,P	650,620,648	–	D to B = 8.0 B to Q = 25	250
Dual MOS-to-TTL Level Translator With Three-State Output	MC54468F,L	607,632	MC74468F,L,P	607,632,646	10	20	150

① F suffix denotes Flat Package. L suffix denotes Dual In-Line Ceramic Package. P suffix denotes Dual In-Line Plastic Package.

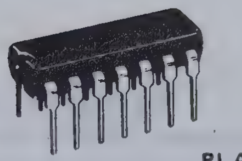
*Add delay/Carry delay.

2 Logic Levels/3 Logic Levels.

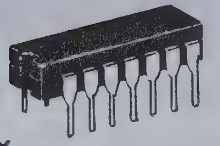
INTEGRATED CIRCUITS

MC400 Series (0 to +75°C)
MC500 Series (-55 to +125°C)

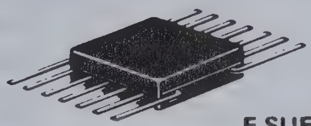
MTTL integrated circuits comprise a family of transistor-transistor logic designed for general purpose digital applications. The family has a medium operating speed (20 MHz clock rate), good external noise immunity, high fan out, and the capability of driving lines up to 600 pF capacitance.



P SUFFIX
PLASTIC PACKAGE
CASE 646



L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116



F SUFFIX
CERAMIC FLAT PACKAGE
CASE 607

MAXIMUM RATINGS

Rating	Value	Unit
Supply Voltage — Continuous MC500/550 Series MC400/450 Series	 +8.0 +7.0	Vdc
Supply Operating Voltage Range	4.5 to 6.0	Vdc
Input Voltage	+5.5	Vdc
Output Voltage	+5.5	Vdc
Operating Temperature Range MC500/550 Series MC400/450 Series	 -55 to +125 0 to +75	°C
Storage Temperature Range Ceramic Package Plastic Package	 -65 to +150 -55 to +125	°C
Maximum Junction Temperature MC500/550 Series MC400/450 Series	 +175 +150	°C
Thermal Resistance - Junction To Case (θ_{JC}) Ceramic Package Plastic Package	 0.09 0.15	°C/mW
Thermal Resistance - Junction To Ambient (θ_{JA}) Ceramic Package Plastic Package	 0.26 0.30	°C/mw

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Function	Type ① Case 607,632,646 0 to +75°C	Case 607, 632 -55 to +125°C	Loading Factor Each Output MC400 Series	MC500 Series	Propagation Delay ns typ	Power Dissipation mW typ/pkg
Dual 4-Input NAND Gate	MC400 MC450	MC500 MC550	12 6	15 7	10	30
Expandable 4-Wide 2-2-2-3-Input AND-OR-INVERT Gate	MC401 MC451	MC501 MC551	12 6	15 7	12	30
8-Input NAND Gate	MC402 MC452	MC502 MC552	12 6	15 7	12	15
2-Wide 3-Input AND-OR-INVERT Gate with Gated Complement	MC403 MC453	MC503 MC553	12 6	15 7	11	35
Expandable 3-Wide 3-Input AND-OR-INVERT Gate	MC404 MC454	MC504 MC554	12 6	15 7	12	25
Expandable 2-Wide 4-Input AND-OR-INVERT Gate	MC405 MC455	MC505 MC555	12 6	15 7	12	20
Expandable 8-Input NAND Gate	MC406 MC456	MC506 MC556	12 6	15 7	18	15
Line Driver	MC407 MC457	MC507 MC557	12 6	15 7	25 @ 1000 pF Load	60
Quad 2-Input NAND Gate	MC408 MC458	MC508 MC558	12 6	15 7	10	60
4-Wide 3-2-2-3 Input Expander for AND-OR-INVERT Gates	MC409 MC459	MC509 MC559	12 6	15 7	–	–
Dual 4-Input Expander for AND-OR-INVERT Gates	MC410 MC460	MC510 MC560	12 6	15 7	–	–
Dual 4-Input Expander for NAND Gates	MC411 MC461	MC511 MC561	12 6	15 7	–	–

(continued)

① F suffix denotes Flat Package, L suffix denotes dual in-line Ceramic Package, P suffix denotes dual in-line Plastic Package, (i.e., MC401F = Flat Package, MC401L = Ceramic Package, MC401P - Plastic Package.)

MTTL I INTEGRATED CIRCUITS (continued)

FUNCTIONS AND CHARACTERISTICS (continued)

Function	Type ①		Loading Factor Each Output		Propagation Delay	Power Dissipation mW
	Case 607,632,646 0 to +75°C	Case 607, 632 -55 to +125°C	MC400 Series	MC500 Series	ns typ	typ/pkg
Triple 3-Input NAND Gate	MC412 MC462	MC512 MC562	12 6	15 7	10	45
R-S Flip-Flop	MC413 MC463	MC513 MC563	12 6	15 7	20/15*	30
Gated R-S Flip-Flop	MC414 MC464	MC514 MC564	12 6	15 7	20/7.5*	30
AND J-K Flip-Flop	MC415 MC465	MC515 MC565	12 6	15 7	13/25*	40
OR J-K Flip-Flop	MC416 MC466	MC516 MC566	12 6	15 7	13/25*	50
Triple 2-Input Buss Driver	MC419 MC469	MC519 MC569	– –	– –	50/15*	54
Expandable Dual 2-Wide 2-Input AND-OR-INVERT Gate	MC420 MC470	MC520 MC570	12 6	15 7	12	40
AC Coupled R-S Flip-Flop	MC421 MC471	MC521 MC571	12 6	15 7	18	30
Dual Type D Flip-Flop	MC422 MC472	MC522 MC572	12 6	15 7	16	84
Dual J-K Flip-Flop (separate clock)	MC423 MC473	MC523 MC573	13 7	16 8	10/12*	110
Dual J-K Flip-Flop (common clock)	MC424 MC474	MC524 MC574	13 7	16 8	10/12*	110
Dual 3-Input Pulse Shaper/Delay AND Gate	MC426 MC476	MC526 MC576	13 7	16 8	15	60
OR Expandable Dual 4-Input AND Gate	MC427 MC477	MC527 MC577	12 6	15 7	10	38
Dual 2-Wide 2-3 Input OR Expander	MC428 MC478	MC528 MC578	– –	– –	–	15
Hex Inverter	MC429 MC479	MC529 MC579	12 6	15 7	10	90

① F suffix denotes Flat Package, L suffix denotes dual in-line Ceramic Package, P suffix denotes dual in-line Plastic Package, (i.e., MC401F = Flat Package, MC401L = Ceramic Package, MC401P - Plastic Package.)

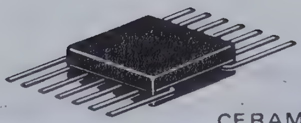
$^{*}t_{pd+}/t_{pd-}$

MTTL II

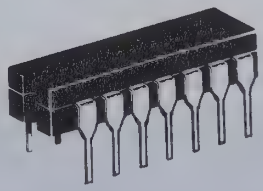
INTEGRATED CIRCUITS

MC2000 Series (0 to +75°C)
MC2100 Series (–55 to +125°C)

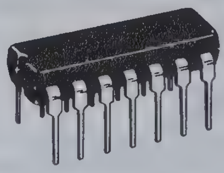
MTTL II integrated circuits comprise a family of transistor-transistor logic designed for general purpose digital applications. The family has a high operating speed (30-50 MHz clock rate), good external noise immunity, high fan out, and the capability of driving capacitive loads to 600 pF.



F SUFFIX
CERAMIC FLAT PACKAGE
CASE 607



L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116



P SUFFIX
PLASTIC PACKAGE
CASE 646

MAXIMUM RATINGS

Rating	Value	Unit
Supply Voltage-Continuous — MC2100 Series MC2000 Series	+8.0 +7.0	Vdc
Supply Operating Voltage Range	4.5 to 6.0	Vdc
Input Voltage	+5.5	Vdc
Output Voltage	+5.5	Vdc
Operating Temperature Range — MC2100 Series MC2000 Series	–55 to +125 0 to +75	°C
Storage Temperature Range — Ceramic Package — Plastic Package	–65 to +150 –55 to +125	°C
Maximum Junction Temperature — MC2100 Series MC2000 Series	+175 +150	°C
Thermal Resistance-Junction to Case (θ_{JC}) — Ceramic Package — Plastic Package	0.09 0.15	°C/mW
Thermal Resistance-Junction to Ambient (θ_{JA}) — Ceramic Package — Plastic Package	0.26 0.30	°C/mW

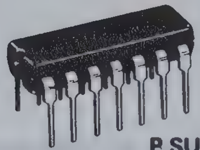
FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Function	Type ①		Loading Factor Each Output		Propagation Delay	Power Dissipation mW
	Case 607,632,646 0 to +75°C	Case 607, 632 -55 to +125°C	MC2000 Series	MC2100 Series	ns typ	typ/pkg
Expandable 2-Wide 4-Input AND-OR-INVERT Gate	MC2000 MC2050	MC2100 MC2150	9 5	11 6	7.0	27
Quad 2-Input NAND Gate	MC2001 MC2051	MC2101 MC2151	9 5	11 6	6.0	88
4-Wide 3-2-2-3 Input Expander for AND-OR-INVERT Gates	MC2002 MC2052	MC2102 MC2152	9 5	11 6	–	28
Dual 4-Input NAND Gate	MC2003 MC2053	MC2103 MC2153	9 5	11 6	6.0	44
Expandable 4-Wide 2-2-2-3 Input AND-OR-INVERT Gate	MC2004 MC2054	MC2104 MC2154	9 5	11 6	7.0	36
8-Input NAND Gate	MC2005 MC2055	MC2105 MC2155	9 5	11 6	8.0	22
Dual 4-Input Expander for AND-OR-INVERT Gates	MC2006 MC2056	MC2106 MC2156	9 5	11 6	–	14
Triple 3-Input NAND Gate	MC2007 MC2057	MC2107 MC2157	9 5	11 6	6.0	66
Expandable 8-Input NAND Gate	MC2011 MC2061	MC2111 MC2161	9 9	11 6	11	22
Expandable 3-Wide 3-Input AND-OR-INVERT Gate	MC2012 MC2062	MC2112 MC2162	9 5	11 6	6.0	39
Expandable Dual 2-Wide 2-Input AND-OR-INVERT Gate	MC2013 MC2063	MC2113 MC2163	9 5	11 6	7.0	58
Quad 2-Input Lamp/ Line Driver	— MC2065	— MC2165	— 24	— 30	20	105
Hex Inverter	MC2016 MC2066	MC2116 MC2166	5 5	9 9	6.0	132
Dual J-K Flip-Flop (separate clock)	MC2023 MC2073	MC2123 MC2173	9 5	11 6	f = 70 MHz	110
Dual J-K Flip-Flop (common clock)	MC2024 MC2074	MC2124 MC2174	9 5	11 6	f = 70 MHz	110
AND J-K Flip-Flop	MC2025 MC2075	MC2125 MC2175	9 5	11 6	f = 50 MHz	50
OR J-K Flip-Flop	MC2026 MC2076	MC2126 MC2176	9 5	11 6	f = 50 MHz	60
OR J-K Flip-Flop	MC2028 MC2078	MC2128 MC2178	9 5	11 6	f = 35 MHz	60

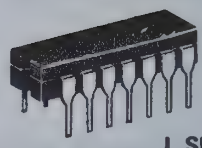
① F suffix denotes Flat Package, L denotes Dual In-Line Ceramic Package, P denotes Plastic Package, (i.e., MC2000F = Flat Package, MC2100L = Dual In-Line Ceramic, MC2000P = Plastic Package.)

INTEGRATED CIRCUITS

MC3000 Series (0 to +75°C)
MC3100 Series (-55 to +125°C)

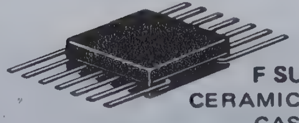


P SUFFIX
PLASTIC PACKAGE
CASE 646



L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116

MTTL III integrated circuits comprise a family of transistor-transistor logic designed for general purpose digital applications. The family has a high operating speed (30-50 MHz clock rate), good external noise immunity, high fan-out, and the capability of driving lines up to 600 pF capacitance.



F SUFFIX
CERAMIC PACKAGE
CASE 607

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Function	Type ①		Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	Case 605, 607, 632 0 to +70°C	Case 607, 632 -55°C to +125°C			
Quad 2-Input NAND Gate	MC3000(74H00)	MC3100(54H00)	10	6.0	88
Quad 2-Input AND Gate	MC3001(74H08)	MC3101(54H08)	10	9.0	112
Quad 2-Input NOR Gate	MC3002(74H02)	MC3102(54H02)	10	6.0	122
Quad 2-Input OR Gate	MC3003(74H32)	MC3103(54H32)	10	9.0	150
Quad 2-Input NAND Gate (Open Collector)	MC3004(74H01)	MC3104(54H01)	10	8.0	88
Triple 3-Input NAND Gate	MC3005(74H10)	MC3105(54H10)	10	6.0	66
Triple 3-Input AND Gate	MC3006(74H11)	MC3106(54H11)	10	9.0	84
Triple 3-Input NAND Gate (Open Collector)	MC3007(74H12)	Mc3107(54H12)	10	8.0	66
Hex Inverter	MC3008(74H04)	MC3108(54H04)	10	6.0	140
Hex Inverter	MC3009(74H05)	MC3109(54H05)	10	8.0	90
Dual 4-Input NAND Gate	MC3010(74H20)	MC3110(54H20)	10	6.0	44
Dual 4-Input AND Gate	MC3011(74H21)	MC3111(54H21)	10	9.0	56
Dual 4-Input NAND Gate (Open Collector)	MC3012(74H22)	MC3112(54H22)	10	8.0	44
8-Input NAND Gate	MC3015(74H31)	MC3115(54H31)	10	8.0	22
8-Input NAND Gate	MC3016(74H30)	MC3116(54H30)	10	8.0	22
4-Wide 3-2-2-3 Input Expander For AND-OR-INVERT Gates	MC3018(74H62)	MC3118(54H62)	••	Δt_{pd1} = 0.4 Δt_{pd0} = 0.05	40
Triple 3-Input Expander For AND-OR Gates	MC3019(74H61)	MC3119(54H61)	••	Δt_{pd1} = 0.4 Δt_{pd0} = 0.05	25
Expandable Dual 2-Wide 2-Input AND-OR-INVERT Gate	MC3020(74H50)	MC3120(54H50)	10	6.0	62.5
Quad 2-Input Exclusive OR Gate	MC3021(74H86)	MC3121(54H86)	8	14	100
Quad 2-Input Exclusive NOR Gate	MC3022(74H89)	MC3122(54H89)	8	14	85
Dual 2-Wide 2-Input AND-OR-INVERT Gate	MC3023(74H51)	MC3123(54H51)	10	6.0	62.5
Dual 4-Input NAND Buffer Gate	MC3024(74H40)	MC3124(54H40)	30	6.0	90
Dual 4-Input NAND Power Gate	MC3025(74H36)	MC3125(54H36)	20	6.0	70
Dual 4-Input AND Power Gate	MC3026(74H39)	MC3126(54H39)	20	9.0	90
Dual 3-Input 3-Output AND Series Terminated Line Driver	MC3028(74H28)	MC3128(54H28)	•	9.0	56
Dual 3-Input 3-Output NAND Series Terminated Line Driver	MC3029(74H29)	MC3129(54H29)	•	6.0	44
Dual 4-Input Expander for AND-OR-INVERT Gates	MC3030(74H60)	MC3130(54H60)	••	Δt_{pd} = 1.0	15
Expandable 4-Wide 2-2-2-3 Input AND-OR Gate	MC3031(74H52)	MC3131(54H52)	10	10	87.5
Expandable 4-Wide 2-2-2-3 Input AND-OR-INVERT Gate	MC3032(74H53)	MC3132(54H53)	10	7.0	40
4-Wide 2-2-2-3 Input AND-OR-INVERT Gate	MC3033(74H54)	MC3133(54H54)	10	7.0	40
Expandable 2-Wide 4-Input AND-OR-INVERT Gate	MC3034(74H55)	MC3134(54H55)	10	7.0	30
AND J-K Flip-Flop	MC3050(74H115)	MC3150(54H115)	10	f = 40 MHz	80
AND Input J-K Flip-Flop	MC3051(74H116)	MC3151(54H116)	10	f = 50 MHz	50
AND Input JJ-KK Flip-Flop	MC3052(74H117)	MC3152(54H117)	10	f = 40 MHz	75
Double-Edge-Triggered Master-Slave Type D Flip-Flop	MC3053(74H118)	MC3153(54H118)	10	–	100
OR Input J-K Flip-Flop	MC3054(74H71)	MC3154(54H71)	10	f = 30 MHz	95
AND Input J-K Flip-Flop	MC3055(74H72)	MC3155(54H72)	10	f = 30 MHz	80
Dual Type D Flip-Flop	MC3060(74H79)	MC3160(54H79)	10	f = 30 MHz	120
Dual J-K Flip-Flop	MC3061(74H119)	MC3161(54H119)	10	f = 50 MHz	100
Dual J-K Flip-Flop	MC3062(74H120)	MC3162(54H120)	10	f = 50 MHz	100
Dual J-K Flip-Flop	MC3063(74H73)	MC3163(54H73)	10	f = 30 MHz	176
Edge-Triggered Dual Type D Flip-Flop	MC74H74A	MC54H74A	10	16	84

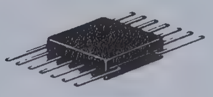
① F suffix denotes Flat Package, L suffix denotes Dual In-Line Ceramic Package, P suffix denoates Plastic Package, (i.e., MC3000F = Flat Package, MC3000L = Ceramic Package, MC3000P = Plastic Package).
•Direct Output = 10 minus the number of resistor-terminated outputs being used.
••Full output loading factor of the expandable gate is maintained.

MTTL COMPLEX FUNCTIONS MTTL

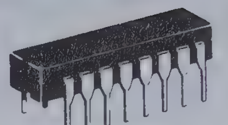
INTEGRATED CIRCUITS

The MTTL complex functions are designed for digital applications in the medium to high-speed range.

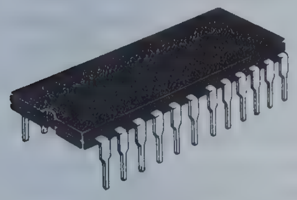
These MTTL devices provide significant reduction in package count and increased logic per function over devices in the basic MTTL and MDTL families.



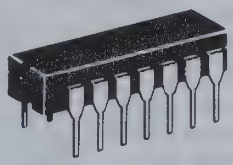
F SUFFIX
CERAMIC PACKAGE
CASE 607



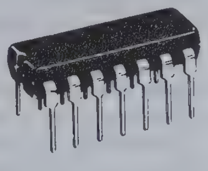
L SUFFIX
CERAMIC PACKAGE
CASE 620



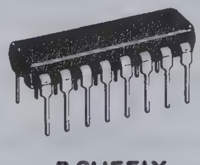
L SUFFIX
CERAMIC PACKAGE
CASE 623



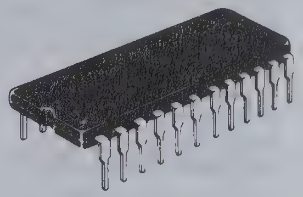
L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116



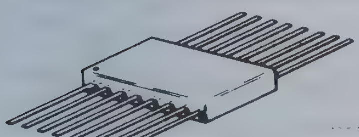
P SUFFIX
PLASTIC PACKAGE
CASE 646



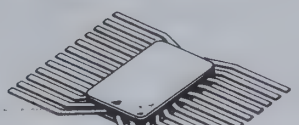
P SUFFIX
PLASTIC PACKAGE
CASE 648



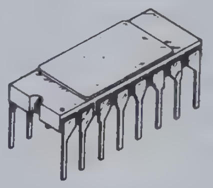
P SUFFIX
PLASTIC PACKAGE
CASE 649



F SUFFIX
CERAMIC PACKAGE
CASE 650



F SUFFIX
CERAMIC PACKAGE
CASE 667



AL SUFFIX
CERAMIC PACKAGE
CASE 690

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

All devices shown can be used with all MTTL and MDTL devices; however, the loading factors shown reflect use with other devices in the same MC-number series unless otherwise noted.

Function	Type ①				Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
Dual 4-Channel Data Selector	MC4300F,L	607,632	MC4000F,L,P	607,632,646	10	Control Line = 18 Data Line = 11	150
BCD-to-Binary/Binary-to-BCD Number Converter	–	–	MC4001L,P	620,648	Open Collector I_{OL} = 16 mA	Address Time <45 ns	300
Dual Data Distributor	–	–	MC4002F,L,P	607,632,646	10	10.5	175
16-Bit Scratch Pad Memory Cell	MC4304F,L	607,632	MC4004F,L,P	607,632,646	I_{OL} = 40 mA	Write mode: 25 Sense mode: 15	250
16-Bit Scratch Pad Memory Cell	MC4305F,L	607,632	MC4005F,L,P	607,632,646	Open Collector I_{OL} = 20 mA	Write mode: 25 Sense mode: 15	250
Binary to One-of-Eight Line Decoder	‡MC4306F,L	607,632	‡MC4006F,L,P	607,632,646	10	14	100
Dual Binary to One-of-Four Line Decoder	MC4307L	620	MC4007L,P	620,648	10	14	125
8-Bit Parity Tree	‡MC4308F,L	607,632	‡MC4008F,L,P	607,632,646	10	15 to 30	150
Dual 4-Bit Parity Tree	MC4310F,L	607,632	MC4010F,L,P	607,632,646	10	9.5 to 22	125
4-Bit Shift Register	–	–	MC4012F,L,P	607,632,646	10	22/bit	180
Quad Type D Flip-Flop	–	–	MC4015L,P	620,648	10	16	190
Programmable Modulo-N Decade Counter	‡MC4316L	620	‡MC4016L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Programmable Modulo-N Hexadecimal Counter	‡MC4318L	620	‡MC4018L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Dual 4-Bit Comparator (Open Collector)	–	–	MC4021P	648	10	20	250
Dual 4-Bit Comparator	–	–	MC4022P	648	10	20	250
4-Bit Universal Counter	–	–	MC4023F,L,P	607,632,646	10	16/bit	200
Dual Voltage-Controlled Multivibrator	MC4324F,L	607,632	MC4024F,L,P	607,632,646	7	f_{max} = 30 MHz	150
Full Adder	MC4326F,L	607,632	MC4026F,L,P	607,632,646	15/12••	25/13#	90
Full Adder	MC4327F,L	607,632	MC4027F,L,P	607,632,646	7/6••	25/13#	90
Adder (Dependent Carry)	MC4328F,L	607,632	MC4028F,L,P	607,632,646	15/12••	25/13#	125
Adder (Dependent Carry)	MC4329F,L	607,632	MC4029F,L,P	607,632,646	7/6••	25/13#	125
Adder (Independent Carry)	MC4330F,L	607,632	MC4030F,L,P	607,632,646	15/12••	25/13#	125
Adder (Independent Carry)	MC4331F,L	607,632	MC4031F,L,P	607,632,646	7/6••	25/13#	125
Carry Decoder	MC4332F,L	607,632	MC4032F,L,P	607,632,646	–	Δt_{pd} = 4.0/decoder	20
Quad Latch (Open Collector)	MC4335F,L	607,632	MC4035F,L,P	607,632,646	7	25	140
Quad Latch	MC4337F,L	607,632	MC4037F,L,P	607,632,646	10	25	150

① F suffix denotes ceramic flat package. L suffix denotes ceramic dual in-line package. P suffix denotes plastic dual in-line package.

•• MC4300 Series/MC4000 Series; loading specified for use with MTTL I devices. # Add delay/Carry delay. †High/Low

‡MC544xx/744xx is exact replacement for MC43xx/40xx.

MTTL COMPLEX LOGIC FUNCTIONS (continued)

FUNCTIONS AND CHARACTERISTICS (continued)

Function	Type ①				Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
Inverting/Non-Inverting One-of-Eight Decoder	–	–	MC4038P	648	Open Collector I_{OL} = 20 mA	Address Time < 45 ns	240
Seven-Segment Character Generator	–	–	MC4309P	648			240
Binary to Two-of-Eight Decoder	–	–	MC4040P	648			240
Single-Error Hamming Code Detector and Generator	–	–	MC4041P	648			240
Quad Predriver	–	–	MC4042F,L,P	607,632,646	I_{OL} = 50 mA Open Collector	15	120
Dual Line Selector	–	–	MC4043F,L,P	607,632,646	I_{OL} = 400 mA Pulsed	20	70
Phase-Frequency Detector	MC4344F,L	607,632	MC4044F,L,P	607,632,646	10	9.0	85
Non-Inverting One-of-Eight Decoder	–	–	MC4048P	648	10	Address Time <50 ns	240
Counter-Latch Decoder	‡MC4350F,L	650,620	‡MC4050F,L,P	650,620,648	Open Collector I_{OL} = 40 mA	f_{tog} = 40 MHz	450
Counter-Latch Decoder	–	–	MC4051F,L,P	650,620,648	Open Emitter 40 mA Sourcing Capability @ 10% Duty Cycle	f_{tog} = 35 MHz	450
Dual Majority Logic Gate	–	–	MC4062P	646	–	Z = 20 $\overline{Z}$ = 11	75
BCD-to-Decimal Decoder and High-Level Driver	MC5441AL	620	MC7441AL,P	620,648	–	–	105
BCD-to-Decimal Decoder	MC5442L	620	MC7442L,P	620,648	10	2 Logic Levels = 22 3 Logic Levels = 23	140
Excess Three-to-Decimal Decoder	MC5443L	620	MC7443L,P	620,648	10	2 Logic Levels = 22 3 Logic Levels = 23	140
Excess Three Gray-to-Decimal Decoder	MC5444L	620	MC7444L,P	620,648	10	2 Logic Levels = 22 3 Logic Levels = 23	140
BCD to One-of-Ten Decoder/Driver	MC5445L	620	MC7445L,P	620,648	–	50 max	215
BCD-to-Seven Segment Deocder/Driver	MC5446L	620	MC7446L,P	620,648	BI/RBO = 5	–	265
BCD-to-Seven Segment Decoder/Driver	MC5447L	620	MC7447L,P	620,648	BI/RBO = 5	–	265
BCD-to-Seven Segment Decoder/Driver	MC5448L	620	MC7448L,P	620,648	BI/RBO = 5 a thru g = 4	–	265
BCD-to-Seven Segment Decoder/Driver	MC5449F	607	MC7449F	607	6	–	165
Quad Latch	MC5475L	620	MC7475L,P	620,648	10	30	160
Quad Latch	MC5477F	607	MC7477F	607	10	30	160
Gated Full Adder	MC5480L	632	MC7480L,P	632,646	$S,\overline{S}$ = 10 $\overline{C_{out}}$ = 5 A*, B* = 3	55/10#	105
2-Bit Full Adder	MC15482F,L	607,632	MC17482F,L,P	607,632,646	10	15/12#	165
2-Bit Full Adder	MC25482F,L	607,632	MC27482F,L,P	607,632,646	10	15/12#	165
4-Bit Binary Full Adder	MC5483L	620	MC7483L,P	620,648	S = 10 C_{out} = 5	35	390
16-Bit Scratch Pad Memory Cell With Gated Inputs	MC5484L	620	–	–	I_{OL} = 40 mA Open Collector I_{OL} = 20 mA	Write Mode: 25 Sense Mode: 15	250
	–	–	MC7484L,P	620,648			
Decade Counter	MC5490F,L	607,632	MC7490F,L,P	607,632,646	10	20/bit	160
8-Bit Shift Register	MC5491AL	632	MC7491AL,P	632,646	10	25	175
Divide-by-Twelve Counter	MC5492F,L	607,632	MC7492F,L,P	607,632,646	10	60	160
4-Bit Binary Counter	MC5493F,L	607,632	MC7493F,L,P	607,632,646	10	20/bit	160
4-Bit Shift Register	MC5494L	620	MC7494L,P	620,648	–	25	175
4-Bit Shift Register	MC5495F,L	607,632	MC7495F,L,P	607,632,646	10	25	250
5-Bit Shift Register	MC5496F,L	650,620	MC7496F,L,P	650,620,648	–	25	240
Dual 4-Bit Latch	MC54100F,L	667,623	MC74100F,L,P	667,623,649	10	30	320
Monostable Multivibrator	MC54121F,L	607,632	MC74121F,L,P	607,632,646	10	t_{PLH}, B to Q = 35	90
BCD to One-of-Ten Decoder/Driver	MC54145L	620	MC74145L,P	620,648	–	50 max	215
16-Channel Data Selector	MC54150L	623	MC74150L,P	623,649	–	8.5 to 35	200
8-Channel Data Selector	MC54151L	620	MC74151L,P	620,648	–	8.5 to 35	145
8-Channel Data Selector/Multiplexer	MC54152F,L	607,632	MC74152F,L,P	607,632,646	10	8.5 to 35	130
Dual 4-Channel Data Selector/Multiplexer	MC54153F,L	650,620	MC74153F,L,P	650,620,648	10	12 to 22	180
Dual 2-to-4 Line Decoder/1-to-4 Line Demultiplexer	MC54155F,L	650,620	MC74155F,L,P	650,620,648	10	2 Logic Levels = 16 3 Logic Levels = 21	125
Dual 2-to-4 Line Decoder/1-to-4 Line Demultiplexer (Open Collector)	MC54156F,L	650,620	MC74156F,L,P	650,620,648	10	2 Logic Levels = 16 3 Logic Levels = 21	125
Quad 2-Input Data Selector/Multiplexer	MC54157F,L	650,620	MC74157F,L,P	650,620,648	10	40	150
8-Bit Parallel-Out Serial Shift Register	MC54164AF,L	607,632	MC74164AF,L,P	607,632,646	5	f_{tog} = 36 MHz	185
8-Bit Odd/Even Generator/Checker	MC54180L	632	MC74180P	646	10	15 to 30	170
4-Bit Arithmetic Logic Unit/ Function Generator	MC54181F,L	667,623	MC74181F,L,P	667,623,649	10	12 to 35	470

① F suffix denotes ceramic flat package. L suffix denotes ceramic dual in-line package. P suffix denotes plastic dual in-line package.

** MC4300 Series/MC4000 Series; loading specified for use with MTTL I devices. # Add delay/Carry delay. †High/Low

‡MC544xx/744xx is exact replacement for MC43xx/40xx.

MTTL COMPLEX LOGIC FUNCTIONS (continued)

FUNCTIONS AND CHARACTERISTICS (continued)

Function	Type ①				Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
Look-Ahead Carry Generator	MC54182F,L	650,620	MC74182F,L,P	650,620,648	10	–	180
Presettable Decade Up/Down Counter	MC54192F,L	650,620	MC74192F,L,P	650,620,648	10	14 to 31	325
Presettable 4-Bit Binary Up/Down Counter	MC54193F,L	650,620	MC74193F,L,P	650,620,648	10	14 to 31	325
Binary to One-of-Eight Line Decoder	‡MC54406F,L	607,632	‡MC74406F,L,P	607,632,646	10	14	100
8-Bit Parity Tree	‡MC54408F,L	607,632	‡MC74408F,L,P	607,632,646	10	15 to 30	150
Programmable Modulo-N Decade Counter	‡MC54416L	620	‡MC74416L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Programmable Modulo-N Counter	MC54417L	620	MC74417L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Programmable Modulo-N Hexadecimal Counter	‡MC54418L	620	‡MC74418L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Programmable Modulo-N Counter	MC54419L	620	MC74419L,P	620,648	8	Clock to Q3 = 50 Clock to Bus = 35	250
Counter-Latch-Decoder	‡MC54450F,L	650,620	‡MC74450F,L,P	650,620,648	Open Collector I_{OL} = 40 mA	f_{tog} = 40 MHz	450
Dual Decade Counter	MC54452F,L	650,620	MC74452F,L,P	650,620,648	10	f = 40 MHz	350
Dual Hexadecimal Counter	MC54453F,L	650,620	MC74453F,L,P	650,620,648	10	f = 40 MHz	350
Dual Decade Up/Down Counter	MC54454L	623	MC74454L,P	623,649	10	40	600
Dual Binary Up/Down Counter	MC54455L	623	MC74455L,P	623,649	10	40	600
NBCD Adder	MC54456F,L	650,620	MC74456F,L,P	650,620,648	10	30	300
Bus Transfer Switch	MC54460F,L	650,620	MC74460F,L,P,	650,620,648	–	D to B = 8.0 B to Q = 25	250
Dual MOS-to-TTL Level Translator with Three-State Output	MC54468F,L	607,632	MC74468F,L,P	607,636,646	10	20	150
Quad Exclusive OR Gate	MC8241F,L	607,632	MC7241F,L,P	607,632,646	10	10	225
Quad Exclusive NOR Gate (Open Collector)	MC8242F,L	607,632	MC7242F,L,P	607,632,646	10	18	170
Binary to One-of-Eight Decoder	MC8250L	632	MC7250L,P	632,646	10	30	75
Binary to One-of-Ten Decoder	MC8251L	620	MC7251L,P	620,648	10	30	80
Arithmetic Logic Element	MC8260F,L	667,623	MC7260F,L,P	667,623,649	6	14 to 24	400
Fast Carry Extender	MC8261F,L	607,632	MC7261F,L,P	607,632,646	6	8.0 to 16	95
2-Input, 4-Bit Data Selector	MC8266F,L	650,620	MC7266F,L,P	650,620,648	10	13 to 27	200
2-Input, 4-Bit Data Selector (Open Collector)	MC8267F,L	650,620	MC7267F,L,P	650,620,648	10	13 to 27	200
4-Bit Shift Register	MC8270F,L	607,632	MC7270F,L,P	607,632,646	7.5	25	180
4-Bit Shift Register	MC8271F,L	650,620	MC7271F,L,P	650,620,648	7.5	25	180
Presettable Decade Counter	MC8280F,L	607,632	MC7280F,L,P	607,632,646	4	f_{tog} = 25 MHz	130
Presettable Binary Counter	MC8281F,L	607,632	MC7281F,L,P	607,632,646	4	f_{tog} = 25 MHz	130
Universal 4-Bit Shift Register	MC9300F,L	650,620	MC8300F,L,P	650,620,648	6	25	300
BCD-to-Decimal Decoder	MC9301F,L	650,620	MC8301F,L,P	650,620,648	10	22	125
Dual Full Adder	MC9304F,L	650,620	MC8304F,L,P	650,620,648	$\overline{C}_{o1},\overline{C}_{o2} = 7$ $S1,S2 = 10$ $\overline{S}1,S2 = 9$	8.0 to 28	110
Presettable Decade Up/Down Counter	MC9306L	623	MC8306L,P	623,649	6	Clock to Q = 20	350
BCD-to-Seven Segment Decoder	MC9307F,L	650,620	MC8307F,L,P	650,620,648	MC9307/8307 a thru g = 8/7 $\overline{RBO}$ = 2/1.5	250	165
Dual 4-Bit Latch	MC9308F,L	667,623	MC8308F,L,P	667,623,649	9	E to Q = 25	325
Dual 4-Channel Data Selector	MC9309F,L	650,620	MC8309F,L,P	650,620,648	Z,W = 10 $\overline{Z},\overline{W}$ = 9	9.0 to 24	150
Presettable Decade Counter	MC9310F,L	650,620	MC8310F,L,P	650,620,648	6	14 to 35	300
One of 16 Decoder	MC9311F,L	667,623	MC8311F,L,P	667,623,649	10	$\overline{E}$ to Q = 26 max	175
8-Channel Data Selector	MC9312F,L	650,620	MC8312F,L,P	650,620,648	Z = 20/10† $\overline{Z}$ = 18/9†	9.0 to 24	135
Quad Latch	MC9314F,L	650,620	MC8314F,L,P	650,620,648	10	12 to 25	200
Presettable 4-Bit Binary Counter	MC9316F,L	650,620	MC8316F,L,P	650,620,648	6	14 to 35	300
8-Input Priority Encoder	MC9318F,L	650,620	MC8318F,L,P	650,620,648	E_{out} = 5 $\overline{GS}$ = 6 $\overline{Q}$ = 10	10 to 30	225
Quad 2-Input Data Selector/Multiplexer	MC9322F,L	650,620	MC8322F,L,P	650,620,648	10	40	150
5-Bit Comparator	MC9324F,L	650,620	MC8324F,L,P	650,620,648	10	40	220
Dual 8-Bit Shift Register	MC9328L	620	MC8328L,P	620,648	6	C to Q = 22 (t_{PHL}) 13 (t_{PLH}) $\overline{MR}$ to Q = 35	250
Quad Latch	MC9375L	620	MC8375L,P	620,648	10	30	160
Quad Latch	MC9377F	607	MC8377F	607	10	30	160
4-Bit Binary Full Adder	MC9383L	620	MC8383L,P	620,648	S = 10 C_{out} = 5	35	390
8-Channel Data Selector	MC93151L	620	MC83151L,P	620,648		8.5 to 35	145

① F suffix denotes ceramic flat package. L suffix denotes ceramic dual in-line package. P suffix denotes plastic dual in-line package.

•• MC4300 Series/MC4000 Series; loading specified for use with MTTL I devices. # Add delay/Carry delay. †High/Low

‡MC544xx/744xx is exact replacement for MC43xx/40xx.

MTTL COMPLEX LOGIC FUNCTIONS (continued)

FUNCTIONS AND CHARACTERISTICS (continued)

Function	Type ①				Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
8-Channel Data Selector/Multiplexer	MC93152L	632	MC83152L,P	632,646	10	8.5 to 35	130
Dual 4-Channel Data Selector/ Multiplexer	MC93153L	620	MC83153L,P	620,648	10	12 to 22	180
Retriggerable Monostable Multivibrator	MC9601F,L	607,632	MC8601F,L,P	607,632,646	MC9601 = 6 MC8601 = 8	25	75
Dual Retriggerable Resettable Monostable Multivibrator	MC9602F,L	650,620	MC8602F,L,P	650,620,648	MC9602 = 6 MC8602 = 8	25	160
Monostable Multivibrator	MC9603F,L	607,632	MC8603F,L,P	607,632,646	10	t_{PLH}, B to Q = 35	90
			0 to +85°C				
64-Bit Random Access Memory	–	–	MCM4064L	620	Open Collector I_{OL} = 15 mA	Access Time <60 ns	6 mW/bit
			0 to +70°C				
Binary to BCD Number Converter	–	–	MCM4067AL	690	Open Collector I_{OL} = 12 mA	Address Time <50 ns	615
	–	–	MCM4068AL	690			
Hollerith to ASCII Converter	–	–	MCM4069AL	690	Open Collector I_{OL} = 12 mA	Address Time <40 ns	615
	–	–	MCM4070AL	690			

① F suffix denotes ceramic flat package. L suffix denotes ceramic dual in-line package. P suffix denotes plastic dual in-line package.

BEAM LEAD INTEGRATED CIRCUITS

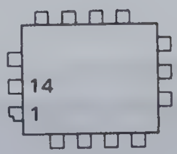
MCBC5400 Series (-55 to +125°C)
MCB5400F Series (-55 to +125°C)

BEAM LEAD

MCBC5400/MCB5400F series integrated circuits comprise a family of transistor-transistor logic designed for general purpose digital applications. The family has a medium operating speed (15-30 MHz clock rate), good external noise immunity, high fan out, and the capability of driving capacitive loads of up to 600 pF.

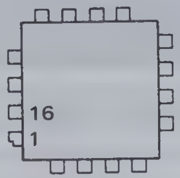
This series is produced using beam lead sealed junction technology. These devices are particularly useful in highly reliable systems using hybrid beam lead assembly techniques or standard flat package assembly techniques.

F SUFFIX
CERAMIC PACKAGE
CASE 607



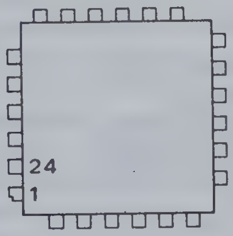
BEAM LEAD CHIP
(14 Lead)
(Geometry Side Down)

• (actual size)



BEAM LEAD CHIP
(16 Lead)
(Geometry Side Down)

• (actual size)



BEAM LEAD CHIP
(24 Lead)
(Geometry Side Down)

• (actual size)

MAXIMUM RATINGS

Rating	Value	Unit
Power Supply Voltage	7.0	Vdc
Input Voltage	5.5	Vdc
Operating Temperature Range	-55 to +125	°C
Storage Temperature Range — Ceramic	-65 to +150	°C

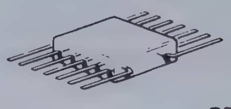
FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Function	Type		Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
	Chip -55° to + 125°C	Case 607 -55° to +125°C			
Quad 2-Input NAND Gate	MCBC5400	MCB5400F	10	10	40
Quad 2-Input NAND Gate (Open Collector Output)	MCBC5401	MCB5401F	10	35	40
Quad 2-Input NOR Gate	MCBC5402	MCB5402F	10	10	48
Hex Inverter	MCBC5404	MCB5404F	10	13	60
Hex Inverter (Open Collector)	MCBC5405	MCB5405F	10	35	60
Triple 3-Input NAND Gate	MCBC5410	MCB5410F	10	10	30
Dual 4-Input NAND Gate	MCBC5420	MCB5420F	10	10	20
8-Input NAND Gate	MCBC5430	MCB5430F	10	10	10
Dual 4-Input NAND Buffer	MCBC5440	MCB5440F	30	13	50
Expandable Dual 2-Wide 2-Input AND-OR-INVERT Gate	MCBC5450	MCB5450F	10	13	28
Dual 2-Wide 2-Input AND-OR-INVERT Gate	MCBC5451	MCB5451F	10	13	28
Expandable 4-Wide 2-Input AND-OR-INVERT Gate	MCBC5453	MCB5453F	10	13	22
4-Wide 2-Input AND-OR-Invert Gate	MCBC5454	MCB5454F	10	13	22
Dual 4-Input Expander for AND-OR-INVERT Gate	MCBC5460	MCB5460F	—	5.0	8.0
J-K Flip-Flop	MCBC5472	MCB5472F	10	30	40
Dual J-K Flip-Flop	MCBC5473	MCB5473F	10	30	80
Dual Type D Flip-Flop	MCBC5479	MCB5479F	10	16	84
4-Input AND Driver with NOR Strobe	—	MCB54140F	—	70	20

MTTL Dielectrically Isolated INTEGRATED CIRCUITS MTTL

MCE54H00 Series, MCE5400 Series (–55 to +125°C)
MCE74H00 Series, MCE7400 Series (0 to +70°C)

The Dielectrically Isolated Integrated Circuit (DIIC) MTTL family is designed specifically for use in military and space applications that require a high degree of reliability under severe radiation environments and post irradiation operation. The MTTL DIIC family utilizes nichrome resistors, post metalization passivation, monometallic interconnections, and very small high frequency transistor structures to enhance the radiation resistant qualities of this line.



F SUFFIX
CERAMIC PACKAGE
CASE 607

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

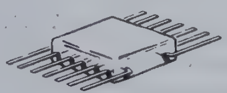
Function	MCE54H00/74H00 Series Type		Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation m/W typ/pkg
	-55 to +125°C	0 to +70°C			
Quad 2-Input NAND Gate	MCE54H00	MCE74H00	10	6.0	80
Quad 2-Input NAND Gate (Open Collector Output)	MCE54H01	MCE74H01	10	8.0	80
Hex Inverter	MCE54H04	MCE74H04	10	6.0	120
Triple 3-Input NAND Gate	MCE54H10	MCE74H10	10	6.0	60
Dual 4-Input NAND Gate	MCE54H20	MCE74H20	10	6.0	40
11-Input NAND Gate	MCE54H31	MCE74H31	10	9.0	20
Dual 4-Input NAND Power Gate	MCE54H40	MCE74H40	30	6.0	80
Dual 2-Wide 2-Input AND-OR-INVERT Gate	MCE54H51	MCE74H51	10	6.0	58
4-Wide 2-Input AND-OR-INVERT Gate	MCE54H54A	MCE74H54A	10	6.0	40
Dual 2-Wide 2-3-Input AND-OR-INVERT Gate	MCE54H56	MCE74H56	10	6.0	58
4-Wide 3-3-2-3-Input AND-OR-INVERT Gate	MCE54H57	MCE74H57	10	6.0	40
Dual Type D Flip-Flop	MCE54H79	MCE74H79	10	16	140
Binary To One-Of-Eight Line Decoder	MCE54H146	MCE74H146	10	–	130
	MCE5400/7400 Series Type				
	-55 to +125°C	0 to +70°C			
Dual J-K Flip-Flop	MCE54103	MCE74103	10	8.0	100

NETWORKS Dielectrically Isolated INTEGRATED CIRCUITS NETWORKS

MCE7000 SERIES (0° to +100°C)

The MCE7000 series uses a dielectric isolation instead of the usual junction isolation to combat the effects of gamma radiation. Each component is isolated by a high resistance (10^{10} ohms) layer of SiO_2. Dielectric isolation also lowers inter-component capacitance and improves efficiency.

F SUFFIX
CERAMIC PACKAGE
CASE 606
TO-91



F SUFFIX
CERAMIC PACKAGE
CASE 607

Function	Type	Power Dissipation mW typ/pkg	Case
Seven-Diode Array	MCE7003	–	607
Diode-Resistor Network	MCE7005	20*	606
Sixteen-Diode Array	MCE7006	–	606
Twelve-Resistor Network	MCE7007	97	607

*100 Ω resistor.

Dielectrically Isolated INTEGRATED CIRCUITS

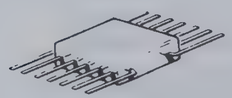
MCE930 Series (–55 to +125°)

The Dielectrically Isolated MDTL family is intended for use in military and space applications that require a high degree of reliability under severe radiation environments. In addition to dielectric isolation, this family of devices utilizes nichrome resistors throughout. A post-metalization passivation process further enhances the radiation resistance qualities of the family and very small high frequency transistor structures are used throughout.

Dielectrically Isolated MDTL has the same electrical specifications as the MC930 family and may be used interchangeably with it. This eliminates the need for redesigning existing equipment to gain radiation-resistance and allows the design engineer to utilize a familiar logic type for new systems.

MAXIMUM RATINGS

Rating	Value	Unit
Supply Voltage — Continuous Pulsed, < 1 second	8.0 12	Vdc
Output Current (into outputs) — Buffers, Power Gates — Continuous Pulsed, < 30 ms All other types	 150 300 30	mAdc
Input Forward Current	-10	mAdc
Input Reverse Current — Buffers, Power Gates All other types	 5.0 1.0	mAdc
Operating Temperature Range — MCE930 Series	-55 to +125	°C
Storage Temperature Range	-65 to +150	°C



F SUFFIX
CERAMIC PACKAGE
CASE 607

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 Vdc, T_A = 25°C)

Function	Type Case 607 -55 to +125°C	Loading Factor Each Output	Power Dissipation mW typ/pkg
Expandable Dual 4-Input NAND Gate	MCE930	8.0	22
Expandable Dual 4-Input Buffer	MCE932	25	85
Dual 4-Input Expander	MCE933	–	–
Hex Inverter	MCE936	8	66
Expandable Dual 4-Input NAND Power Gate	MCE944	27	65
Clocked Flip-Flop	MCE945	10	60
Quad 2-Input NAND Gate	MCE946	8	44
Clocked Flip-Flop	MCE948	9.0	70
Triple 3-Input NAND Gate	MCE962	8.0	33

MDTL INTEGRATED CIRCUITS MDTL

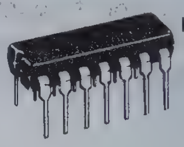
MC830 Series (0 to +75°C)
MC930 Series (–55 to +125°)

MAXIMUM RATINGS

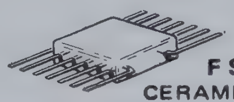
Rating	Value	Unit
Supply Voltage —		Vdc
Operating	4.5 to 5.5	
Continuous	8.0	
Pulsed, < 1 second	12	
Output Current (Into Outputs with Outputs Low)		mAdc
Buffers, Power Gates — Continuous	100	
Pulsed, < 30 ms	300	
All other types — Continuous	30	
Pulsed, < 30 ms	90	
Input Forward Current —		mAdc
Continuous	-10	
Pulsed, < 30 ms	-30	
or		
Negative Voltage at Input —		Vdc
Continuous	-0.5	
Pulsed, < 30 ms	-1.5	
Input Reverse Current	1.0	mAdc
or		
Positive Voltage at Diode Input	5.5	Vdc
Operating Temperature Range		°C
MC930 Series	-55 to +125	
MC830 Series	0 to +75	
Storage Temperature Range		°C
Metal Can, Ceramic Package	-65 to +150	
Plastic Package	-55 to +125	
Maximum Junction Temperature		°C
MC930 Series	175	
MC830 Series	150	

MDTL integrated circuits provide an excellent balance of speed, power dissipation, and noise immunity for general purpose digital applications. The line includes many multifunction types. Additional logic power is provided by the "wired OR" capability of the basic MDTL gate.

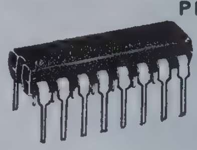
G SUFFIX
METAL PACKAGE
CASE 603-02
TO-100



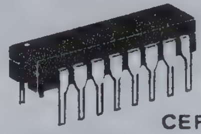
P SUFFIX
PLASTIC PACKAGE
CASE 646



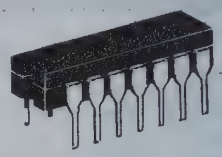
F SUFFIX
CERAMIC PACKAGE
CASE 607



P SUFFIX
PLASTIC PACKAGE
CASE 648



L SUFFIX
CERAMIC PACKAGE
CASE 620



L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116

FUNCTIONS AND CHARACTERISTICS (V_{CC} = 5.0 Vdc, T_A = 25°C)

Function	Type ① 0 to +75°C	Case	Type ① -55 to +125°C	Case	Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
Expandable Dual 4 Input NAND Gate	MC830	607,632,646	MC930	607,632	8	30	22
Expandable Dual 3-2 Input NAND Gate	MC830	603	MC930	603	8	30	22
Expandable Dual 4-Input Buffer	MC832	607,632,646	MC932	607,632	25	35	85
Expandable Dual 3 2 Input Buffer	MC832	603	MC932	603	25	35	85
Dual 4 Input Expander	MC833	607,632,646	MC933	607,632	–	–	–
Dual 4 3 Input Expander	MC833	603	MC933	603	–	–	–
Hex Inverter	MC834	607,632,646	MC934	607,632	8	30	66
Hex Inverter (without output resistors)	MC835	607,632,646	MC935	607,632	8	30	42
Hex Inverter	MC836	607,632,646	MC936	607,632	8	30	66
Hex Inverter	MC837	607,632,646	MC937	607,632	7	25	90
Decade Counter	MC838	607,632,646	MC938	607,632	8	30 MHz ③	150
Divide-by-Sixteen Counter	MC839	607,632,646	MC939	607,632	8	30 MHz ③	150
Hex Inverter (without input diodes)	MC840	607,632,646	MC940	607,632	8	30	66
Hex Inverter (without output resistors and input diodes)	MC841	607,632,646	MC941	607,632	8	30	42
4 Input AND Driver with NOR Strobe	MC843	603	MC943	603	250 mA	80	50
Expandable Dual 4-Input Power Gate	MC844	607,632,646	MC944	607,632	27	30	65
Expandable Dual 3-2 Input Power Gate	MC844	603	MC944	603	27	30	65
Clocked Flip-Flop	MC845	603,607,632,646	MC945	603,607,632	12/10 ②	40	60
Quad 2-Input NAND Gate	MC846	607,632,646	MC946	607,632	8	30	44
Quad Inverter	MC846	603	MC946	603	8	30	44
Quad 2-Input Gate Expander	MC847	607,632,646	MC947	607,632	-	–	–
Clocked Flip-Flop	MC848	603,607,632,646	MC948	603,607,632	11/9 ②	40	70
Quad 2-Input NAND Gate (2 k pullup resistor)	MC849	607,632,646	MC949	607,632	7	25	66
Quad Inverter (2 k pullup resistor)	MC849	603	MC949	603	7	25	60
Pulse Triggered Binary	MC850	603,607,632,646	MC950	603,607,632	10/8 ②	15	50
Monostable Multivibrator	MC851	603,607,632,646	MC951	603,607,632	10	40	30
Dual J-K Flip-Flop (common clock and C_D, separate S_D)	MC852	607,632,646	MC952	607,632	12/10 ②	40	120
Dual J-K Flip-Flop (separate clock and S_D, no C_D)	MC853	607,632,646	MC953	607,632	12/10 ②	40	120

① F suffix denotes Ceramic Flat Package, G suffix denotes Metal Can, L suffix denotes Dual in-Line Ceramic Package, P suffix denotes Dual In-Line Plastic Package. (i.e., MC830G = Metal Can, MC830F = Flat Package, MC830L = Dual In-Line Ceramic Package, MC830P = Plastic Package)

② Fan-out for MC830 series type/Fan-out for MC930 series type.

③ Counting frequency.

(continued)

MDTL (continued)

Function	Type ① 0 to +75°C	Case	Type ① -55 to +125°C	Case	Loading Factor Each Output	Propagation Delay ns typ	Power Dissipation mW typ/pkg
Dual J-K Flip-Flop (common clock and C_D, separate S_D, 2 k pullup resistor)	MC855	607,632,646	MC955	607,632	11/9 ②	40	140
Dual J-K Flip-Flop (separate clock and S_D, no C_D, 2 k pullup resistor)	MC856	607,632,646	MC956	607,632	11/9 ②	40	140
Quad 2-Input Buffer	MC857	607,632,646	MC957	607,632	25	35	170
Quad 2-Input NAND Power Gate	MC858	607,632,646	MC958	607,632	27	30	130
Expandable Dual 4-Input NAND Gate (2 k pullup resistor)	MC861	607,632,646	MC961	607,632	7	25	33
Expandable Dual 3-2 Input NAND Gate (2 k pullup resistor)	MC861	603	MC961	603	7	25	33
Triple 3-Input NAND Gate	MC862	607,632,646	MC962	607,632	8	30	33
Dual 2-Input NAND Gate plus Inverter	MC862	603	MC962	603	8	30	30
Triple 3-Input NAND Gate (2 k pullup resistor)	MC863	607,632,646	MC963	607,632	7	25	50
Dual 2-Input NAND Gate plus Inverter (2 k pullup resistor)	MC863	603	MC963	603	7	25	45
Dual 6-Input NAND Gate	MC1800	607,632,646	MC1900	607,632	8	30	22
Dual 5-Input NAND Gate (2 k pullup resistor)	MC1801	607,632,646	MC1901	607,632	7	25	33
Expandable 8-Input NAND Gate	MC1802	607,632,646	MC1902	607,632	8	30	11
Expandable 8-Input NAND Gate (2 k pullup resistor)	MC1803	607,632,646	MC1903	607,632	7	25	16.5
10-Input NAND Gate	MC1804	607,632,646	MC1904	607,632	8	30	11
10-Input NAND Gate (2 k pullup resistor)	MC1805	607,632,646	MC1905	607,632	7	25	16.5
Quad 2-Input AND Gate	MC1806	607,632,646	MC1906	607,632	8	35	72
Quad 2-Input AND Gate (2 k pullup resistor)	MC1807	607,632,646	MC1907	607,632	7	30	85
Quad 2-Input OR Gate	MC1808	607,632,646	MC1908	607,632	8	35	97
Quad 2-Input OR Gate (2 k pullup resistor)	MC1809	607,632,646	MC1909	607,632	7	30	115
Quad 2-Input NOR Gate	MC1810	607,632,646	MC1910	607,632	8	30	60
Quad 2-Input NOR Gate (2 k pullup resistor)	MC1811	607,632,646	MC1911	607,632	7	25	72
Quad 2-Input Exclusive OR Gate	MC1812	607,632,646	MC1912	607,632	8	40	120
Quad Latch	MC1813	620,648	—	—	7	35	220
Quad Latch	MC1814	607,632,646	MC1914	607,632	7	35	220
Parallel Gated Clocked Flip-Flop	MC1815	607,632,646	MC1915	607,632	12/10 ②	40	65
Parallel Gated Clocked Flip-Flop	MC1816	607,632,646	MC1916	607,632	11/9 ②	40	75
Quad 2-Input NAND Gate (without output resistor)	MC1818	607,632,646	MC1918	607,632	8	30	32
High Voltage Hex Inverter	MC1820	632,646	–	–	7	40	42

① F suffix denotes Ceramic Flat Package, G suffix denotes Metal Can, L suffix denotes Dual in-Line Ceramic Package, P suffix denotes Dual In-Line Plastic Package. (i.e., MC830G = Metal Can, MC830F = Flat Package, MC830L = Dual In-Line Ceramic Package, MC830P = Plastic Package)

② Fan-out for MC830 series type/Fan-out for MC930 series type.

③ Counting frequency.

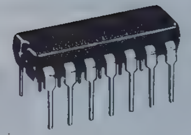
MEDIUM POWER INTEGRATED CIRCUITS

MC700 series (+15 to +55°C)
MC800 series (0 to +75 and 0 to +100°C)
MC900 series (-55 to +125°C)

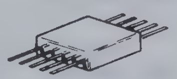
Medium-power MRTL integrated circuits provide a broad line of low-cost, multi-function, digital circuits. Typical gate speed is 12 ns, with power dissipation averages of 19 mW (input high) and 5.0 mW (inputs low) per logic node. Devices from the MC700 Series have loading factors normalized for compatibility with the low-power mW MRTL devices for ease in mixing the two power levels in a system.

G SUFFIX
METAL PACKAGE
CASE 601

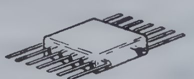
G SUFFIX
METAL PACKAGE
CASE 603-02
TO-100



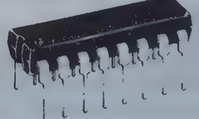
P SUFFIX
PLASTIC PACKAGE
CASE 646



F SUFFIX
CERAMIC PACKAGE
CASE 606
TO-91



F SUFFIX
CERAMIC PACKAGE
CASE 607



P SUFFIX
PLASTIC PACKAGE
CASE 648

FUNCTIONS AND CHARACTERISTICS

(V_{CC} = 3.0 V ±10% for MC900 Series and MC800F, G Series; 3.6 V ±10% for MC800P Series and MC700 Series, T_A = 25°C)

Function	Type ① MC700 Series +15 to +55°C	Case	Type ① MC800 Series 0 to +75°C	Case	Type ① MC800 Series 0 to +100°C	Case	Type ① MC900 Series -55 to +125°C	Case	Output Loading Factor Each Output		tp ns typ	Total Power Dissipation mW typ	
									With mW MRTL	With MRTL		MC700 and MC800P Series	MC800F,G and MC900 Series
Buffer	MC700	601,606			MC800	601,606	MC900	601,606	80	25	20	25/50 ②	16/45 ②
Counter Adapter	MC701	601			MC801	601	MC901	601	16	5	22	80	55
R-S Flip-Flop	MC702	601			MC802	601	MC902	601	13	4	14	32	22
3-Input NOR Gate	MC703	601,606			MC803	601,606	MC903	601,606	16	5	12	28/7.5 ②	19/5.0 ②
Half Adder	MC704	601,606			MC804	601,606	MC904	601,606	16	5	14	65	45
Half-Shift Register	MC705	601,606			MC805	601,606	MC905	601,606	13	4	22	75	53
Half-Shift Register (w/o inverter)	MC706	601,606			MC806	601,606	MC906	601,606	13	4	22	52	36
4-Input NOR Gate	MC707	601,606			MC807	601,606	MC907	601,606	16	5	12	30/7.5 ②	19/5.0 ②
Dual 2-Input NOR Gate	MC714	601,606			MC814	601,606	MC914	601,606	16	5	12	50/15 ②	38/10 ②
Dual 3-Input NOR Gate	MC715	603,606,646	MC815	646	MC815	603,606	MC915	603,606	16	5	12	55/15 ②	38/10 ②
J-K Flip-Flop			MC816	646	MC816	601,606	MC916	601,606	–	3	30	91/79 ③	62/54 ③
J-K Flip-Flop	MC723	601,606,646							10	–	30	91/79 ③	–
Quad 2-Input NOR Gate	MC724,A	607,646	MC824,A	646	MC824	607	MC924	607	16	5	12	100/30 ②	76/20 ②
Dual 4-Input NOR Gate	MC725	607,646	MC825	646	MC825	607	MC925	607	16	5	12	60/15 ②	38/10 ②
J-K Flip-Flop	MC726	603,606,646	MC826	646	MC826	603,606	MC926	603,606	16	5	35	100/86 ③	130/65 ③
Quad Inverter	MC727	603,606			MC827	603,606	MC927	603,606	16	5	12	87/30 ②	76/20 ②
5-Input NOR Gate	MC729	601,606			MC829	603,606	MC929	601,606	16	5	12	33/7.5 ②	19/5.0 ②
Quad Exclusive OR Gate	MC771	607,646	MC871	646	MC871	607	MC971	607	16	5	12	28	72
J-K Flip-Flop	MC774	601			MC874	601	MC974	601	16	5	35	100/86 ③	130/65 ③
Dual Half-Adder	MC775	607,646	MC875	646	MC875	607	MC975	607	16	5	20	120	90
Binary Up Counter	MC777	646	MC877	646					10	3	–	180	–
1 J-K Flip-Flop, 1 Expander, 2 Buffers	MC779	646	MC879	646					–	–	–	141/124 ④	–
Decade Up Counter	MC780	646	MC880	646					10	3	–	250	–
Dual Half-Shift Register	MC783	607,646	MC883	646	MC883	607	MC983	607	13	4	22	140	110
Dual Half-Shift Register (w/inverter)	MC784	607,646	MC884	646	MC884	607	MC984	607	13	4	22	100	75
Quad 2-Input Expander	MC785,A	607,646	MC885,A	646	MC885	607	MC985	607	–	–	12	20/– ②	17/– ②
Dual 4-Input Expander	MC786	607,646	MC886	646	MC886	607	MC986	607	–	–	12	20/– ②	17/– ②
1 J-K Flip-Flop, 1 Inverter, 2 Buffers	MC787	646	MC887	646					–	–	–	138/132 ④	–
Dual 3-Input Buffer, non-inverting	MC788	607,646	MC888	646	MC888	607	MC988	607	80	25	24	145/56 ②	128/42 ②
Hex Inverter	MC789,A	607,646	MC889,A	646	MC889	607	MC989	607	16	5	12	130/15 ②	76/20 ②
Dual J-K Flip-Flop	MC790	607,646	MC890	646	MC890	607	MC990	607	10	3	35	182/158 ③	124/108 ③
Dual J-K Flip-Flop	MC791	607,646	MC891	646	MC891	607	MC991	607	16	5	40	190/160 ③	155/130 ③
Triple 3-Input NOR Gate	MC792	607,646	MC892	646	MC892	607	MC992	607	16	5	12	82/24 ②	57/15 ②
Serial-Parallel Shift Register	MC794	646	MC894	646					16	5	55	225	–
Dual Full Adder	MC796	607,646	MC896	646	MC896	607	MC996	607	16	5	60	225	190
Dual Full Subtractor	MC797	607,646	MC897	646	MC897	607	MC997	607	16	5	60	225	190
Dual Buffer	MC799	603,606,646	MC899	646	MC899	603,606	MC999	603,606	80	25	15	50/90 ②	32/90 ②
Dual 4-Channel Data Selector	MC9701	648	MC9801	648					16	5	25	100	–
Dual J-K Flip-Flop	MC9702	646	MC9802	646					10	3	35	182/158 ③	–
4-Bit Parallel Full Adder	MC9704	648	MC9804	648					6	2	125	265	–
Dual 4-Channel Data Distributor	MC9707	648	MC9807	648					16	5	25	150	–
Quad Schmitt Trigger	MC9709	646	MC9809	646					16	5	30	95	–
Quad 2-Input AND Gate	MC9713	646	MC9813	646					16	5	28	100	–
Quad 2-Input NAND Gate	MC9714	646	MC9814	646					16	5	14 ⑤	145	–
Quad 2-Input OR Gate	MC9715	646	MC9815	646					16	5	14 ⑤	28/100 ②	–
Hex Expander	MC9719,A	607,646	MC9819,A	646	MC9819	607	MC9919	607	–	–	12	13/– ②	13/– ②

"A" suffix devices have insured capability to drive at least one MTTL load or two MDTL loads.
① G Suffix denotes Metal Can, F suffix denotes Flat Package, P suffix denotes Plastic Package.
② Inputs High/Inputs Low
③ Only Clock Inputs High/Inputs Low
④ Only Clock Input high on flip-flop, other element Inputs High/Inputs Low
⑤ Operating Frequency (MHz)

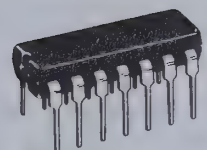
INTEGRATED CIRCUITS

MC708 series (+15 to +55°C)
MC808 series (0 to +75°C)
MC908 series (–55 to +125°C)

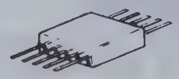
Low-power mW MRTL integrated circuits are designed for use where minimal system power consumption is desired. Typical gate speed is 27 ns, with typical power dissipation of 6.5 mW (input high) and 0.5 mW (inputs low) per logic node. Devices from the MC708 Series can be mixed with devices from the medium-power MC700 Series which has loading factors normalized for compatibility.

G SUFFIX
METAL PACKAGE
CASE 601

G SUFFIX
METAL PACKAGE
CASE 603-02
TO-100

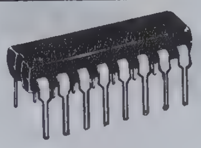


P SUFFIX
PLASTIC PACKAGE
CASE 646



F SUFFIX
CERAMIC PACKAGE
CASE 606
TO-91

F SUFFIX
CERAMIC PACKAGE
CASE 607



P SUFFIX
PLASTIC PACKAGE
CASE 648

FUNCTIONS AND CHARACTERISTICS

(V_{CC} = 3.0 V ± 10% for MC908 Series, 3.6 V ± 10% for MC808 Series and MC708 Series; T_A = 25°C)

Function	Type ① MC708 Series +15 to +55°C	Type ① MC808 Series 0 to +75°C	Case	Type ① MC908 Series -55 to +125°C	Case	Output Loading Factor Each Output All Series	tp ns typ	Total Power Dissipation mW typ/pkg	
								MC708 Series & MC808 Series	MC908 Series
Half Adder	MC708	MC808	601,606	MC908	601,606	4	60	19/12.5 ②	14/8.5 ②
2-Input Buffer	MC709	MC809	601,606	MC909	601,606	30	57	7.0/23 ②	5.5/16 ②
Dual 2-Input NOR Gate	MC710	MC810	601,606	MC910	601,606	4	27	10/2.5 ②	8.0/1.0 ②
4-Input OR/NOR Gate	MC711	MC811	601,606	MC911	601,606	4	60	8.0/5.5 ②	6.0/3.5 ②
Half Adder	MC712	MC812	601,606	MC912	601,606	4	66	15.5/10.5 ②	11.5/5.5 ②
Type D Flip-Flop	MC713	MC813	601,606	MC913	601,606	3	75	24/17.5 ③	17.5/13 ③
Quad 2-Input NOR Gate	MC717	MC817	607,646	MC917	607	4	27	20/5.0 ②	16/2.5 ②
Dual 3-Input NOR Gate	MC718	MC818	603,606,646	MC918	603,606	4	27	12/2.5 ②	9.5/1.0 ②
Dual 4-Input NOR Gate	MC719	MC819	607,646	MC919	607	4	27	13/2.5 ②	11/1.0 ②
J-K Flip-Flop	MC720	MC820	601,606	MC920	601,606	2	50	20.5/14.5 ④	15.5/10 ④
Dual 2-Input Gate Expander	MC721	MC821	601,606	MC921	601,606	–	27	3.0/– ②	3.0/– ②
J-K Flip-Flop	MC722	MC822	603,606,646	MC922	603,606	4	70	24/20 ④	17.5/13 ④
5-Input NOR Gate	MC728	MC828	601,606	MC928	601,606	4	27	7.5/1.0 ②	6.5/0.5 ②
Dual Exclusive OR/NOR Gate	MC764	MC864	646	–	–	4	–	25	–
Quad Latch	MC767,A	MC867,A	648	–	–	9	50	110	–
BCD-To-Decimal Decoder	MC770	MC870	648	–	–	7	36	100/– ②	–
Dual J-K Flip-Flop	MC776	MC876	607,646	MC976	607	2	50	41/29 ④	31/20 ④
Dual Type D Flip-Flop	MC778	MC878	607,646	MC978	607	3	60	48/35 ③	35/26 ③
Dual Buffer	MC781	MC881	601	MC981	601	30	57	14/46 ②	11/32 ②
J-K Flip-Flop	MC782	MC882	601	MC982	601	2	80	23/21 ④	15/13 ④
Triple 3-Input NOR Gate	MC793	MC893	607,646	MC993	607	4	27	18/3.5 ②	14/2.0 ②
Dual 2-Input Buffer	MC798	MC898	607,646	MC998	607	30	57	14/46 ②	11/32 ②
Hex Inverter	MC9718	MC9818	646	–	–	4	27	7.0/3.0 ②	–
Hex Expander	MC9720	MC9820	646	–	–	–	12	30/– ②	–
Quad 2-Input Expander	MC9721	MC9821	607,646	MC9921	607	–	27	20/– ②	20/– ②
Dual J-K Flip-Flop	MC9722	MC9822	646	–	–	4	75	24/– ④	–
Quad 2-Input AND Gate	MC9723	MC9823	646	–	–	4	50	12 ⑤	–
Quad 2-Input NAND Gate	MC9724	MC9824	646	–	–	4	50	20/5.0 ②	–
Quad 2-Input OR Gate	MC9725	MC9825	646	–	–	4	50	–/7.0 ②	–

"A" suffix devices have insured capability to drive at least one MTTL load or two MDTL loads.

① G suffix denotes Metal Can, F suffix denotes Flat Package, P suffix denotes Plastic Package.

② Inputs High/Inputs Low unless otherwise noted.

③ Direct Set and Direct Clear Low, All other Inputs High/All Inputs Low.

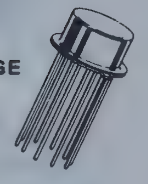
④ Only Clock Input High/All Inputs Low.

⑤ One Input High/One Input Low.

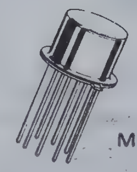
INTEGRATED CIRCUITS

MC1100 Series Metal Gate, High-Threshold P-Channel MOS
MC2200 Series Metal Gate, Low-Threshold P-Channel MOS
MC6500 Series Metal Gate, Low-Threshold N-Channel MOS

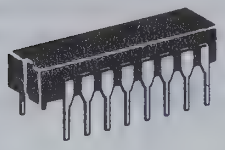
Motorola's MOS monolithic integrated circuits provide low-cost, high-complexity logic in functional blocks. These devices utilize the high component density and simplified processing available with the MOS technology.



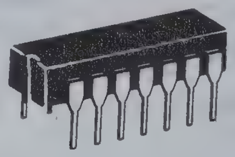
G SUFFIX
METAL PACKAGE
CASE 602A



G SUFFIX
METAL PACKAGE
CASE 619-02



L SUFFIX
CERAMIC PACKAGE
CASE 620



L SUFFIX
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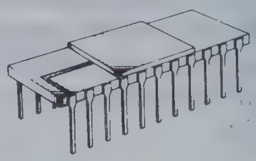
CASE 632
TO-116



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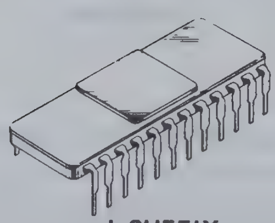
CASE 677



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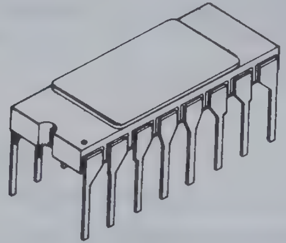
CASE 684



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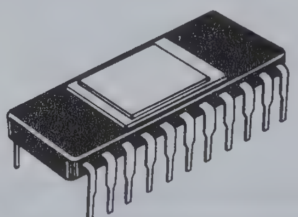
CASE 690



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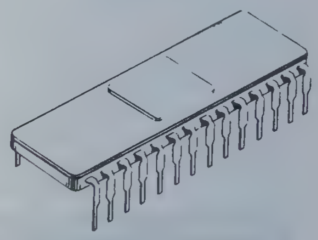
CASE 694



L SUFFIX
CERAMIC PACKAGE
CASE 695

FUNCTIONS AND CHARACTERISTICS

Function	Type	Temperature	Case	Comments
Triple 66-Bit Dynamic Shift Register	MC1141G	0 to +75°C	602A	Operating frequency = 10 kHz to 1.0 MHz, power dissipation = 1.0 mW/bit @ 1.0 MHz.
200-Bit Dynamic Shift Register	MC1142G	0 to +55°C	619-02	Operating frequency = 10 kHz to 1.0 MHz, power dissipation = 1.0 mW/bit @ 1.0 MHz.
8-Channel Multiplex Switch	MC1150L	0 to +75°C	690	High on/off resistance ratio, zero offset voltage, all channel blanking.
Dual 1-of-4 Channel Multiplex Switch	MC1151L	0 to +75°C	690	High on/off resistance ratio, zero offset voltage, all channel blanking.
General-Purpose Logic Element	MC1155L	0 to +75°C	632	Can be externally connected to form a variety of NAND, NOR and functional gate configurations.
Dual 100-Bit Static Shift Register	MC1160G	-55 to +85°C	602A	Operating frequency = dc to 2.0 MHz, non-inverting buffered outputs, independent input/output lines.
Dual 50-Bit Static Shift Register	MC1161G	-55 to +85°C	602A	Operating frequency = dc to 2.0 MHz, non-inverting buffered outputs, independent input/output lines.
Frequency Divider	MC1180L	0 to +70°C	632	Six stages of binary division; particularly suited for tone generation in electronic organs.
Resettable Rhythm Counter	MC1181L	0 to +70°C	620	Asynchronous binary counter designed for driving the count-address inputs of a rhythm generator.
Rhythm Pattern Generator	MC1182L	0 to +70°C	684	Provides 2048 bits of Read Only Memory capability, arranged to generate eight rhythm patterns for triggering eight rhythm instruments in electronic organ applications. The rhythm patterns are specified by the user.
Frequency Synthesizer	MC1183L	0 to +70°C	632	Provides the C9 thru G8 and C8 portions of the top octave synthesizer function for tone generation in electronic organ applications.
Frequency Synthesizer	MC1184L	0 to +70°C	632	Provides the F#8 thru C#8 portion of the top octave synthesizer function for tone generation in electronic organ applications.
General-Purpose Logic Element	MC2255L	0 to +75°C	632	Can be externally connected to form a variety of NAND, NOR, and functional gate configurations.
Terminal Transmitter	MC2257L	0 to +75°C	684	Synchronous/asynchronous data communications adapter. Accepts parallel binary data in the form of characters and serially transmits the data to a modem.

(continued)

FUNCTIONS AND CHARACTERISTICS (continued)

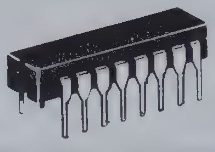
Function	Type	Temperature	Case	Comments
Terminal Receiver	MC2259L	0 to +75°C	695	Synchronous/asynchronous data communications adapter that receives serial digital data from a modem, organizes the data into fixed word lengths corresponding to characters, and transfers these characters to a buffer register from which the character may be accessed in a parallel format.
Quad 80-Bit Static Shift Register	MC6565L	0 to +70°C	694	Completely compatible with TTL, operating frequency = dc to 5.0 MHz, power dissipation = 650 mW max.
2048-Bit Read Only Memory	MCM1110L	-25 to +85°C	684	Mask-programmable static ROM; may be organized as 512 words of 4 bits or 256 words of 8 bits. Output devices may be open drain for use with TTL devices or with pulldown resistors for use with other MOS devices.
2048-Bit Hollerith-to-ASCII Converter	MCM1111L	-25 to +85°C	684	Pre-programmed MCM1110L; 256 words of 8 bits, pulldown resistors in output buffer for compatibility with MOS devices.
2048-Bit Hollerith-to-ASCII Converter	MCM1112L	-25 to +85°C	684	Same as MCM1111L except open-drain output buffers for TTL compatibility.
2240-Bit Read Only Memory	MCM1120L	-25 to +85°C	684 or 695	Mask-programmable static character generator ROM; 64 characters of 35 bits (5X7), seven address inputs, three row select inputs, and chip enable input. Open-drain or push-pull output buffers.
2240-Bit Row Select USASCII Character Generator	MCM1121L	-25 to +85°C	695	Pre-programmed MCM1120L; push-pull output buffers are MOS compatible.
2240-Bit Row Select USASCII Character Generator	MCM1122L	-25 to +85°C	695	Same as MCM1121L except open-drain output buffers that sink 1.6 mA minimum for TTL and DTL compatibility; can be wire ORed for memory expansion.
2240-Bit Read Only Memory	MCM1130L	-25 to +85°C	684 or 695	Mask-programmable static character generator ROM; 64 characters of 35 bits (5X7) or 32 characters of 70 bits (5X14), seven address inputs, five column select inputs, and chip enable input. Open-drain output buffers for TTL compatibility.
2240-Bit Column Select USASCII Character Generator	MCM1131L	-25 to +85°C	684	Pre-programmed MCM1130L; 64 characters of 35 bits (5X7).
2240-Bit Column Select USASCII Character Generator	MCM1132L	-25 to +85°C	695	Same as MCM1131L except only six address inputs and different package.
4096-Bit Read Only Memory	MCM1140L	-25 to +85°C	684	Mask-programmable static ROM; 512 words of 8 bits or 1024 words of 4 bits. Output buffers open-drain or with pulldown resistors.
4096-Bit Read Only Memory	MCM1141L	-25 to +85°C	684	Pre-programmed MCM1140L; 512 words of 8 bits, open-drain output buffers.
2560-Bit Read Only Memory	MCM1150L	-25 to +85°C	684	Mask-programmable static ROM; 512 words of 5 bits or 256 words of 10 bits. Output buffers open-drain or with pulldown resistors.
2560-Bit Read Only Memory	MCM1151L	-25 to +85°C	684	Pre-programmed MCM1150L; 256 words of 10 bits, open-drain output buffers, programmed for ASCII-to-Selectric and Selectric-to-ASCII code conversion.
8192-Bit Read Only Memory	MCM6570L	0 to 70°C	684	Mask-programmable row-select character generator ROM; 128 characters in a 7 x 9 matrix, with the capability of shifting characters that extend below the baseline. Completely compatible with TTL.
8192-Bit Read Only Memory Character Generator	MCM6571L	0 to 70°C	684	Pre-programmed MCM6570L, with modified USASCII code.

Selectric is a registered trademark of IBM

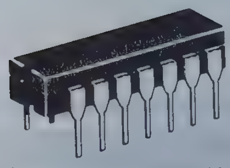
MC14000 and MC14500 Series Complementary MOS

The McMOS series of monolithic integrated logic circuits is designed to provide the system design engineer with a medium-speed integrated circuit family which approaches the ideal in performance. The low power dissipation and flexible power supply requirements of this family of devices greatly simplify power supply design, and the high noise immunity and large fanout capability reduce parts count and simplify printed circuit board layout.

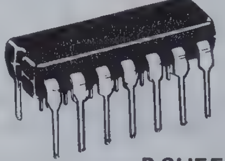
All devices may also be obtained in chip form for the manufacturer of hybrid microcircuits.



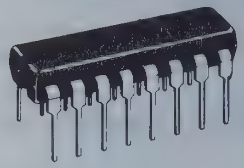
L SUFFIX
CERAMIC PACKAGE
CASE 620



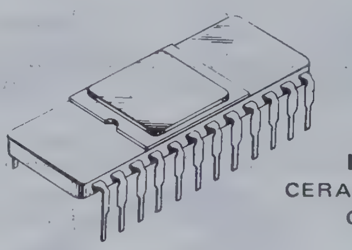
L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116



P SUFFIX
PLASTIC PACKAGE
CASE 646



P SUFFIX
PLASTIC PACKAGE
CASE 648



L SUFFIX
CERAMIC PACKAGE
CASE 684

FEATURES

- Quiescent Power Dissipation = 10 nW/pkg typical for Gates
- High Noise Immunity = 45% of V_{DD} typical
- Supply Voltage Range = 3.0 Vdc to 18 Vdc (AL Series)
  = 3.0 Vdc to 16 Vdc (CL, CP Series)
- Single or Multiple Supply Operation – Positive or Negative
- Fanout – > 50
- Output Logic Excursion Independent of Fanout
- Diode Protection on All Inputs

FUNCTION AND CHARACTERISTICS

Function	Type		Quiescent Power Dissipation nW typ/pkg Series		Propagation Delay ns typ	Case
	V_{DD} = 18 Vdc -55 to +125°C	V_{DD} = 16 Vdc -40 to +85°C	AL	CL/CP		
Dual 3-Input NOR Gate/Inverter	MC14000AL	MC14000CL/CP	10	50	25	632,646
Quad 2-Input NOR Gate	MC14001AL	MC14001CL/CP	10	50	25	632,646
Dual 4-Input NOR Gate	MC14002AL	MC14002CL/CP	10	50	25	632,646
18-Bit Static Shift Register	MC14006AL	MC14006CL/CP	50	200	80	632,646
Dual Pair and Inverter	MC14007AL	MC14007CL/CP	10	50	15	632,646
4-Bit Full Adder	MC14008AL	MC14008CL/CP	1000	1000	170	620,648
Hex Inverter/Buffer	MC14009AL	MC14009CL/CP	100	500	9.0	620,648
Hex Noninverting Buffer	MC14010AL	MC14010CL/CP	100	500	20	620,648
Quad 2-Input NAND Gate	MC14011AL	MC14011CL/CP	10	50	25	632,646
Dual 4-Input NAND Gate	MC14012AL	MC14012CL/CP	10	50	25	632,646
Dual Type D Flip-Flop	MC14013AL	MC14013CL/CP	100	100	40	632,646
Dual 4-Bit Static Shift Register	MC14015AL	MC14015CL/CP	10 µW	10 µW	125	620,648
Quad Analog Switch/Quad Multiplexer	MC14016AL	MC14016CL/CP	200	200	7.0	632,646
Decade Counter/Divider	MC14017AL	MC14017CL/CP	5.0 µW	10 µW	200	620,648
14-Bit Binary Counter	MC14020AL	MC14020CL/CP	200	200	140	620,648
8-Bit Static Shift Register	MC14021AL	MC14021CL/CP	3000	3000	100	620,648
Octal Counter/Divider	MC14022AL	MC14022CL/CP	5.0	10	200	620,648
Triple 3-Input NAND Gate	MC14023AL	MC14023CL/CP	10	50	25	632,646
Seven-Stage Ripple Counter	MC14024AL	MC14024CL/CP	10	10	120	632,646
Triple 3-Input NOR Gate	MC14025AL	MC14025CL/CP	10	50	25	632,646
Dual J-K Flip-Flop	MC14027AL	MC14027CL/CP	50	200	75	620,648
BCD-To-Decimal Decoder/ Binary-To-Octal Decoder	MC14028AL	MC14028CL/CP	75	75	57	620,648
Triple Serial Adder (Positive Logic)	MC14032AL	MC14032CL/CP	1000	1000	90	620,648
8-Bit Static Bus Register	MC14034AL	MC14034CL	5000	5000	175	684
Triple Serial Adder (Negative Logic)	MC14038AL	MC14038CL/CP	1000	1000	90	620,648
12-Bit Binary Counter	MC14040AL	MC14040CL/CP	200	200	140	620,648
Quad Latch	MC14042AL	MC14042CL/CP	50	500	40	620,648
Hex Buffer (Inverting)	MC14049AL	MC14049CL/CP	100	500	18	620,648
Hex Buffer (Noninverting)	MC14050AL	MC14050CL/CP	100	500	18	620,648
Triple Gate (Dual 4-Input NAND Gate and 2-Input NOR/OR Gate or 8-Input AND/NAND Gate)	MC14501AL	MC14501CL/CP	10	50	25	620,648
Strobed Hex Inverter/Buffer	MC14502AL	MC14502CL/CP	10	50	20	620,648
Dual Expandable AND-OR-INVERT Gate	MC14506AL	MC14506CL/CP	100	100	80	620,648
Quad Exclusive OR Gate	MC14507AL	MC14507CL/CP	10	50	35	632,646
Dual 4-Bit Latch	MC14508AL	MC14508CL	1000	1000	75	684
BCD Up/Down Counter	MC14510AL	MC14510CL/CP	1000	1000	100	620,648

(continued)

McMOS INTEGRATED CIRCUITS (continued)

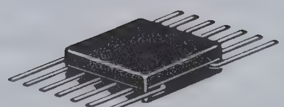
FUNCTION AND CHARACTERISTICS (continued)

Function	Type		Quiescent Power Dissipation nW typ/pkg		Propagation Delay ns typ	Case
	V_{DD} = 18 Vdc -55 to +125°C	V_{DD} = 16 Vdc -40 to +85°C	Series			
			AL	CL/CP		
BCD-To-Seven Segment Latch/Decoder/Driver	MC14511AL	MC14511CL/CP	100	100	250	620,648
8-Channel Data Selector	MC14512AL	MC14512CL/CP	500	500	75	620,648
4-Bit Latch/4 to 16 Line Decoder (High)	MC14514AL	MC14514CL	200	200	300	684
4-Bit Latch/4 to 16 Line Decoder (Low)	MC14515AL	MC14515CL	200	200	300	684
Binary Up/Down Counter	MC14516AL	MC14516CL/CP	1000	1000	40	620,648
Dual 64-Bit Static Shift Register	MC14517AL	MC14517CL	500	1000	180	620
Dual BCD Up Counter	MC14518AL	MC14518CL/CP	4000	4000	100	620,648
4-Bit AND/OR Selector (Quad 2-Channel Data Selector or Quad Exclusive NOR Gate)	MC14519AL	MC14519CL/CP	100	100	85	620,648
Dual Binary Up Counter	MC14520AL	MC14520CL/CP	4000	4000	100	620,648
24-Stage Frequency Divider	MC14521AL	MC14521CL/CP	400	400	1700	620,648
Programmable Divide-By-N- 4-Bit Counter (BCD)	MC14522AL	MC14522CL/CP	1000	1000	100	620,648
Programmable Divide-By-N 4-Bit Counter (Binary)	MC14526AL	MC14526CL/CP	1000	1000	100	620,648
BCD Rate Multiplier	MC14527AL	MC14527CL/CP	1000	1000	70	620,648
Dual Retriggerable/Resettable Monostable Multivibrator	MC14528AL	MC14528CL/CP	50	50	80	620,648
Dual 4-Channel Analog Data Selector	MC14529AL	MC14529CL/CP	250	250	–	620,648
Dual 5-Input Majority Logic Gate	MC14530AL	MC14530CL/CP	100	100	180	620,648
12-Bit Parity Tree	MC14531AL	MC14531CL/CP	100	100	140	620,648
8-Bit Priority Encoder	MC14532AL	MC14532CL/CP	50	50	80	620,648
Dual 4-Channel Data Selector/Multiplexer	MC14539AL	MC14539CL/CP	100	100	75	620,648
BCD-To-Seven Segment Latch/Decoder/Driver	MC14543AL	MC14543CL/CP	100	100	220	620,648
2 x 2-Bit Parallel Binary Multiplier	MC14554AL	MC14554CL/CP	100	100	–	620,648
Dual Binary to 1 of 4 Decoder/Demultiplexer	MC14555AL	MC14555CL/CP	100	100	80	620,648
Dual Binary to 1 of 4 Decoder/ Demultiplexer (Inverting)	MC14556AL	MC14556CL/CP	100	100	90	620,648
4-Bit Arithmetic Logic Unit	MC14581AL	MC14581CL	100	100	225	684
Look-Ahead Carry Block	MC14582AL	MC14582CL/CP	100	100	115	620,648
Dual Schmitt Trigger	MC14583AL	MC14583CL/CP	10	10	200	620,648
4-Bit Magnitude Comparator	MC14585AL	MC14585CL/CP	100	100	150	620,648
64-Bit Random Access Read Write Memory	MCM14505AL	MCM14505CL	300	300	Read Cycle = 150 Write Cycle = 200	632
1024-Bit Read Only Memory	MCM14524AL	MCM14524CL	31	31	180	620

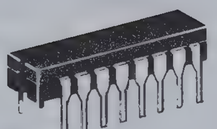
LOGIC PRODUCTS

for

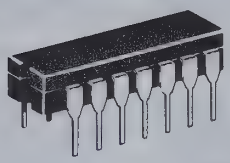
PHASE-LOCKED LOOP APPLICATIONS



F SUFFIX
CERAMIC PACKAGE
CASE 607



L SUFFIX
CERAMIC PACKAGE
CASE 620



L SUFFIX
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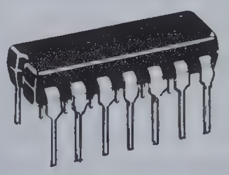
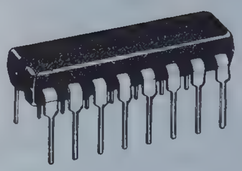
CASE 632
TO-116



P SUFFIX
PLASTIC PACKAGE
CASE 646



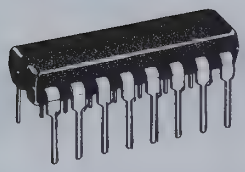
P SUFFIX
PLASTIC PACKAGE
CASE 648

Motorola offers the designer a choice of specially designed integrated circuits for performing phase-locked loop functions: phase detection, frequency division, filtering, and voltage-controlled signal generation. In addition, the choice of circuits permits the designer to select TTL circuits where speed is not critical (<25 MHz), or ECL circuits where high speed is required. The MC12000 series circuits will operate at either +5.0 V or -5.2 V, and translators are included where needed so that all functions are compatible.

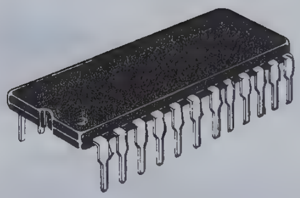
FUNCTIONS AND CHARACTERISTICS

Function	Type				Family	Frequency MHz typ	Power Dissipation mW typ/pkg
	-55 to +125°C	Case	0 to +75°C	Case			
Emitter-Coupled Oscillator	–	–	MC1648	607, 632, 646	MECL	225	150
Voltage-Controlled Multivibrator	–	–	MC1658	620, 648	MECL	150	125
Dual Voltage-Controlled Multivibrator	MC4324	607, 632	MC4024	607, 632, 646	MTTL	30	150
Phase-Frequency Detector	MC4344	607, 632	MC4044	607, 632, 646	MTTL	8.0	85
Digital Mixer/Translator	–	–	MC12000	632	MECL	250	470
Two-Modulus Prescaler	–	–	MC12012	620	MECL	200	500
Counter Control Logic	–	–	MC12014	620	MTTL	8.0 to 25	25
Phase-Frequency Detector	–	–	MC12040	632	MECL	80	425
Programmable Modulo-N Decade Counter (÷0 thru 9)	MC54416 (Was MC4316)	620	MC74416 (Was MC4016)	620, 648	MTTL	8.0	250
Programmable Modulo-N Counter (÷0, 1 and ÷0 thru 4)	MC54417	620	MC74417	620, 648	MTTL	8.0	250
Programmable Modulo-N Hexadecimal Counter (÷0 thru 15)	MC54418 (Was MC4318)	620	MC74418 (Was MC4018)	620, 648	MTTL	8.0	250
Programmable Modulo-N Counter (÷0 thru 3 and ÷0 thru 3)	MC54419	620	MC74419	620, 648	MTTL	8.0	250

BIPOLAR LSI



P SUFFIX
PLASTIC PACKAGE
CASE 648



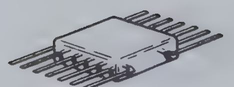
P SUFFIX
PLASTIC PACKAGE
CASE 649

The devices listed form a complete error detection and correction function for magnetic tape systems.

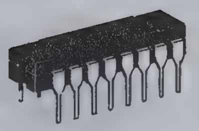
FUNCTIONS AND CHARACTERISTICS

Function	Type 0 to +75°C	Data Rate MHz	Power Dissipation mW typ/pkg	Case
Cyclic Redundancy Check Character Generator (CRCC Generator)	MC8500P	3.0	365	649
Error Pattern Register (EPR)	MC8501P	3.0	320	648
Longitudinal Redundancy Check Character/Data Register (LRCC/Data Register)	MC8502P	3.0	350	649

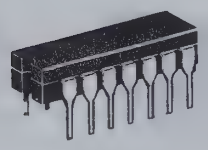
SPECIAL BIPOLAR LOGIC PRODUCTS for *CUSTOM* APPLICATIONS



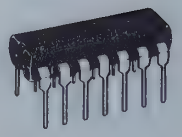
F SUFFIX
CERAMIC PACKAGE
CASE 607



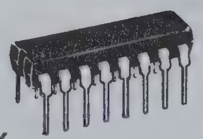
L SUFFIX
CERAMIC PACKAGE
CASE 620



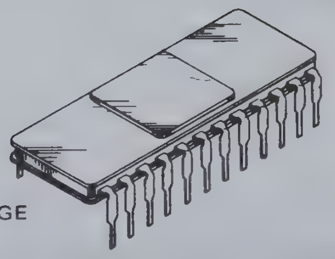
L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116



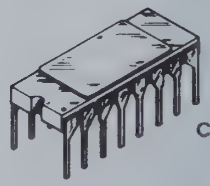
P SUFFIX
PLASTIC PACKAGE
CASE 646



P SUFFIX
PLASTIC PACKAGE
CASE 648



L SUFFIX
CERAMIC PACKAGE
CASE 684



L SUFFIX
CERAMIC PACKAGE
CASE 690

(Additional mask-programmable memories are in the MOS device listing.)

Function	Type	Temperature	Case	Comments
128-Bit Read Only Memory (Formerly XC170,171)	MCM4000	0 to +75°C	620,648	Bipolar read only memory organized as 16 eight-bit words. Compatible with MDTL and all MTTL lines. Open collectors or 2.0 kilohm pullup resistors at buffered output bit lines. Truth table and output option specified by user.
	MCM4300	-55 to +125°C	620	
256-Bit Read Only Memory	MCM4002L	0 to +75°C	620	Bipolar read only memory organized as 32 eight-bit words. Compatible with MDTL and all MTTL lines. Open collectors or 2.0 kilohm pullup resistors at buffered output bit lines. Truth table and output option specified by user.
	MCM4002P	0 to +75°C	648	
1024-Bit Read Only Memory*	MCM4004AL	0 to +70°C	690	Bipolar read only memory organized as 256 four-bit words. Input loading of -0.25 mA maximum. Typical address time of 50 ns, typical chip select time of 25 ns. Open collectors or 2.0 kilohm pullup resistors at output bit lines. Truth table and output option specified by user.
1024-Bit Read Only Memory*	MCM4006AL	0 to +70°C	690	Same as MCM4004AL except input loading of -1.6 mA maximum, typical address time of 40 ns, typical chip select time of 20 ns.
512-Bit Programmable Read Only Memory	MCM5003AL	0 to +70°C	684	Bipolar programmable read only memory organized as 64 eight-bit words. Field programmable by "blowing" appropriate nichrome resistors to break metalization links. Ninth bit available for circuit testing. Open collector outputs.
	MCM5303AL	-55 to +125°C	684	
512-Bit Programmable Read Only Memory	MCM5004AL	0 to +70°C	684	Same as MCM5003AL except 2.0 kilohm pullup resistors on the collector outputs.
	MCM5304AL	-55 to +125°C	684	
25-Gate Array	XC177	-55 to +125°C	607,632	Twenty-five gates with two custom layers of metalization required to complete the circuit and obtain the desired function. Compatible with MDTL and all MTTL lines.
		0 to +75°C	607,632, 646,648	

*Standard options of the MCM4004 and MCM4006 are available as MCM4067 and MCM4068 Binary-to-BCD Number Converters (from MCM4004) and MCM4069 and MCM4070 Hollerith-to-ASCII Converters (from MCM4006). Details are given on the MTTL Complex Functions device listing.

OPERATIONAL AMPLIFIERS

Motorola offers a broad line of operational amplifiers to meet a wide range of usages. From low-cost, industry standard types to high precision circuits the span encompasses a large range of performance capabilities. These linear integrated circuits are available as single, dual, and quad monolithic devices in a variety of package styles as well as standard and beam-lead chips.

OPERATIONAL AMPLIFIERS

Listed in order of increasing input bias current within temperature group.

INTERNALLY COMPENSATED

I_{IB} (µA max)	V_{IO} (mV max)	I_{IO} (nA max)	A_{vol} (V/V min)	V_O @ (V_{pk} min)	R_L & (kΩ)	V_{CC}, V_{EE} (Vdc)	f_c (MHz typ)	BW_p (kHz typ)	SR (V/µs typ)	Case	Type
-55 to +125°C Temperature Range											
0.003	4.0	–	Unity	10	10	±15	20	300	30	601	MLM110
0.0075	5.0	3.0	200,000	12	75	±15	0.2	1.5	0.1	601	MC1776‡
0.015	4.0	2.0	100,000	12	2.0	±15	1.0	40	2.5	601	MC1556
0.02	5.0	3.0	100,000	22	5.0	±28	1.0	23	2.0	601	MC1536*
0.075	2.0	10	50,000	10	2.0	±15	1.0	10	0.5	601	MLM107
0.5	5.0	200	50,000	10	2.0	±15	1.0	10	0.8	601,606,632,665**	MC1741* **†
0.5	5.0	200	50,000	10	2.0	±15	1.0	200	15	601	MC1741S
-25 to +85°C Temperature Range											
0.003	4.0	–	Unity	10	10	±15	20	300	30	601	MLM210
0.075	2.0	10	50,000	10	2.0	±15	1.0	10	0.5	601	MLM207
0 to +75°C Temperature Range											
0.007	7.5	–	Unity	10	10	±15	20	300	30	601	MLM310
0.01	6.0	6.0	50,000	12	75	±15	0.2	1.5	0.1	601	MC1776C‡
0.03	10	10	70,000	11	2.0	±15	1.0	40	2.5	601	MC1456
0.04	10	10	70,000	20	5.0	±28	1.0	23	2.0	601	MC1436*
0.09	12	30	25,000	10	2.0	±15	1.0	40	2.5	601	MC1456C
0.09	12	25	50,000	20	5.0	±28	1.0	23	2.0	601	MC1436C
0.25	7.5	50	25,000	10	2.0	±15	1.0	10	0.57	601	MLM307
0.5	6.0	200	20,000	10	2.0	±15	1.0	10	0.8	601,606,626,632,646	MC1741C*†
0.5	6.0	200	20,000	10	2.0	±15	1.0	200	15	601,626	MC1741SC

NONCOMPENSATED

I_{IB} (µA max)	V_{IO} (mV max)	I_{IO} (nA max)	A_{vol} (V/V min)	V_O @ (V_{pk} min)	R_L & (kΩ)	V_{CC}, V_{EE} (Vdc)	f_c (MHz typ)	BW_p (kHz typ)	SR (V/µs typ)	Case	Type
-55 to +125°C Temperature Range											
0.075	2.0	10	50,000	10	2.0	±15	1.0	10	0.5	601	MLM101A
0.15	10	25	2,500	4.5	1.0	±6.0	2.0	100	1.4	602B,606	MC1531
0.5	3.0	60	50,000	10	1.0	±15	2.0	50	4.2	601,632	MC1539*
0.5	5.0	200	50,000	10	2.0	±15	1.0	10	0.8	601,606**	MC1748* **
0.5	5.0	200	25,000	10	2.0	±15	0.5	4.0	0.25	601,606,632,665**	MC1709* **†
1.0	5.0	150	40,000	11	2.0	±15	0.8	2.0	2.0	602B,606,632	MC1533
2.0	10	100	1,000	3.5	7.0	±6.0	10	150	5.0	602A,606	MC1520
5.0	2.0	500	2,500	3.5	10	+12,-6.0	7.0	10	1.5	601,606,632	MC1712
10	5.0	2000	4,500	4.5	1.0	±6.0	3.0	100	1.7	602B,606	MC1530
-25 to +75°C Temperature Range											
0.075	2.0	10	50,000	10	2.0	±15	1.0	10	0.5	601, 626	MLM201A
0 to +75°C Temperature Range											
0.25	7.5	50	25,000	10	2.0	±15	1.0	10	0.5	601,626	MLM301A
0.3	15	100	1,500	4.0	1.0	±6.0	2.0	100	1.4	602B,606,646	MC1431
0.5	6.0	200	20,000	10	2.0	±15	1.0	10	0.8	601	MC1748C*
1.0	7.5	100	15,000	10	2.0	±15	2.0	50	4.2	601,626,632,646	MC1439*
1.5	7.5	500	15,000	10	2.0	±15	0.5	4.0	0.25	601,606,626,632,646	MC1709C*†
2.0	7.5	500	30,000	10	2.0	±15	0.8	2.0	2.0	602B,606,632,646	MC1433
4.0	15	200	750	3.0	7.0	±6.0	10	150	5.0	602A,606	MC1420
7.5	5.0	2000	2,000	3.5	10	+12,-6.0	7.0	10	1.5	601,606,632	MC1712C
15	10	4000	3,000	4.0	1.0	±6.0	3.0	100	1.7	602B,606,646	MC1430

*Use MCC prefix for nonencapsulated chip.

**Use MCBC prefix for nonencapsulated beam-lead device, use MCB prefix for beam-lead device in flat ceramic package.

†Use MCCF prefix for nonencapsulated flip-chip.

‡I_{set} = 1.5 µA, $|V_{EE}| = V_{CC}$ = 15 V.

DUAL OPERATIONAL AMPLIFIERS

Listed in increasing order of input bias current.

INTERNALLY COMPENSATED

I_{IB} (µA max)	V_{IO} (mV max)	I_{IO} (nA max)	A_{vol} (V/V min)	V_O @ (V_{pk} min)	R_L (kΩ)	& V_{CC}, V_{EE} (Vdc)	f_c (MHz typ)	BW_p (kHz typ)	SR (V/µs typ)	Case	Type
-55 to +125°C Temperature Range											
0.5	5.0	200	50,000	10	2.0	±15	1.1	14	0.8	601,632	MC1558*†
0.5	5.0	200	50,000	10	2.0	±15	1.0	10	0.5	601,606,632	MC1747
0 to +75°C Temperature Range											
0.5	6.0	200	20,000	10	2.0	±15	1.1	14	0.8	601,626,632,646	MC1458*†
0.5	6.0	200	25,000	10	2.0	±15	1.0	10	0.5	601,606,632	MC1747C
0.7	10	300	20,000	9.0	2.0	±15	1.1	14	0.8	601,626,632,646	MC1458C

*Use MCC prefix for nonencapsulated chip.

†Use MCCF for nonencapsulated flip-chip.

NONCOMPENSATED

I_{IB} (µA max)	V_{IO} (mV max)	I_{IO} (nA max)	A_{vol} (V/V min)	V_O @ (V_{pk} min)	R_L (kΩ)	& V_{CC}, V_{EE} (Vdc)	f_c (MHz typ)	BW_p (kHz typ)	SR (V/µs typ)	Case	Type
-55 to +125°C Temperature Range											
0.5	5.0	200	25,000	12	10	±15	1.0	3.0	0.25	632	MC1537
3.0	3.0	300	4,000	2.5	10	±6.0	1.0	40	0.013	602B,607,632	MC1535
0 to +75°C Temperature Range											
1.5	7.5	500	15,000	12	10	±15	1.0	3.0	0.25	632,646	MC1437
5.0	5.0	500	3,500	2.3	10	±6.0	1.0	40	0.013	602B,607,632,646	MC1435

QUAD OPERATIONAL AMPLIFIERS

Internally Compensated

. . .for automotive applications

-40 to +85°C Temperature Range

I_{IB} (µA max)	V_{IO} (mV max)	I_{IO} (nA max)	A_{vol} (V/V min)	V_O @ (V_{pk} min)	R_L (kΩ)	& V_{CC}, V_{EE} (Vdc)	f_c (MHz typ)	BW_p (kHz typ)	SR (V/µs typ)	Case	Type
0.3	–	–	1,000	10	5.0	+15	4.0	20	0.6	646	MC3301
. . .for industrial applications											
0 to +75°C Temperature Range											
0.3	–	–	1,000	10	5.0	+15	5.0	20	0.6	646	MC3401

POWER DRIVERS

INTERNALLY COMPENSATED

I_{IB} (µA max)	V_{IO} (mV max)	I_{IO} (nA max)	A_{vol} (V/V min)	V_O @ (V_{pk} min)	R_L (Ω)	& V_{CC}, V_{EE} (Vdc)	f_c (MHz typ)	BW_p (kHz typ)	SR (V/µs typ)	Case	Comments	Type
-55 to +125°C Temperature Range												
200	–	–	900	12	300	±15	–	1500	75	614	High current gain (70 dB) op ampl power booster I_O = 300 mA max	MC1538
0 to +75°C Temperature Range												
300	–	–	850	11	300	±15	–	1500	75	614	High current gain (70 dB) op ampl power booster, I_O = 300 mA max	MC1438

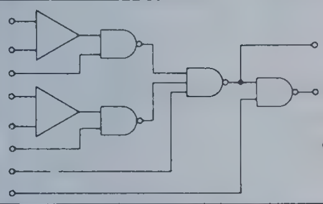
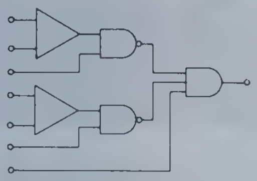
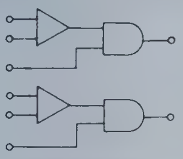
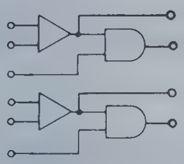
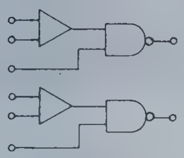
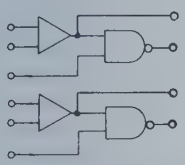
INTERFACE CIRCUITS

Interface circuits fit in the gray area between the linear and digital realms. Usually these IC's perform the necessary translation between an analog signal input and the required digital logic levels or vice versa. To aid in selection, the devices have been divided into five main categories: Sense Amplifiers, Drivers, D/A Converters, Receivers, and Comparators.

SENSE AMPLIFIERS

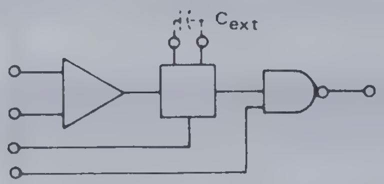
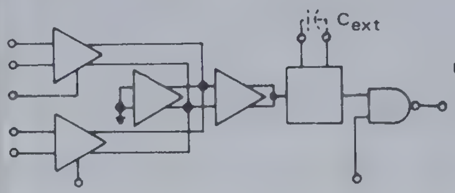
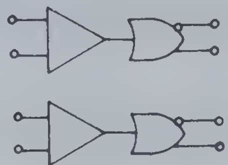
The sense amplifiers listed provided the necessary translation from the outputs of core or plated-wire memories to MTTL (unless otherwise noted) logic levels. Unless noted, all devices are designed to operate from ±5.0 volt power supplies. The output of these sense amplifiers changes logic states when the differential input voltage exceeds a specified threshold level, regardless of input polarity.

CORE MEMORY

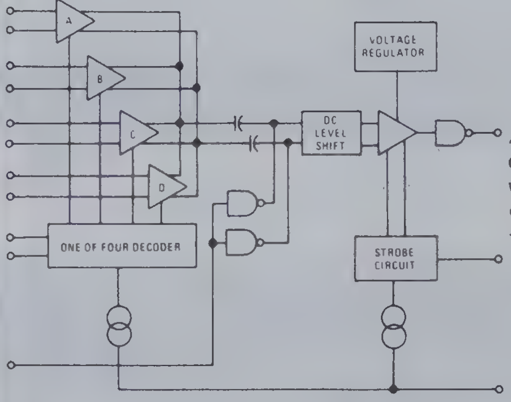
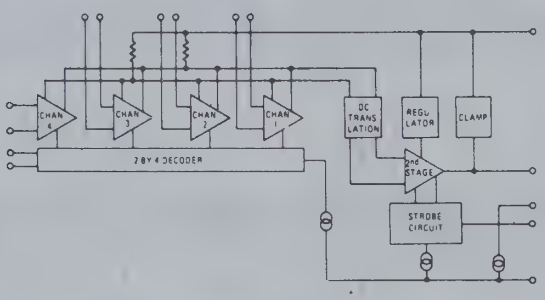
Function	Threshold Voltage @ (mV) min	Threshold Voltage @ (mV) max	V_{ref} (mV)	Propagation Delay (ns max)	Case	Type -55 to +125°C	Type 0 to +70°C
 Dual channel with independent gating, complementary outputs, memory data register	11 36	19 44	15 40	55	620	–	MC7520
	8.0 33	22 47	15 40	55	620	–	MC7521
 Dual channel with open-collector output, high sink current capability	11 36	19 44	15 40	45	620	–	MC7522
	8.0 33	22 47	15 40	45	620	–	MC7523
 Dual with independent strobing	11 36	19 44	15 40	40	620	–	MC7524
	8.0 33	22 47	15 40	40	620	–	MC7525
 Same as MC7524-25 except amplifier test points included	11 36	19 44	15 40	40	620, 648*	–	MC7528
	10 35	20 45	15 40	40	620	MC5528	–
	8.0 33	22 47	15 40	40	620, 648*	MC5529	MC7529
 Same as MC7524-25 except NAND outputs	11 36	19 44	15 40	40	620, 648*	–	MC7534
	10 35	20 45	15 40	40	620	MC5534	–
	8.0 33	22 47	15 40	40	620, 648*	MC5535	MC7535
 Same as MC7528-29 except NAND outputs	11 36	19 44	15 40	40	620, 648*	–	MC7538
	10 35	20 45	15 40	40	620	MC5538	–
	8.0 33	22 47	15 40	40	620, 648*	MC5539	MC7539

*Case 648 used with commercial-temperature-range devices only.

SENSE AMPLIFIERS (continued)
CORE MEMORY (Continued)

Function		Threshold Voltage @ (mV) min	max	V_{ref} (mV)	Propagation Delay (ns max)	Case	Type -55 to +125°C	0 to +75°C
	0.5μs cycle time, 20ns typ response time, ±6.0V power supply	14	20	-6.0V	30	602B, 606, 632	MC1540	MC1440
	0.4μs cycle time, 1.5V common-mode inputs, 1.0mV typ input offset	14	20	-5.0V	30	607, 632	MC1541	MC1441
	Compatible with MECL, +5.0V, -5.2V power supplies, threshold insensitive to supply variations, complementary outputs	17	23	540	35	632	MC1543	–

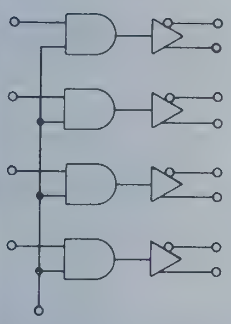
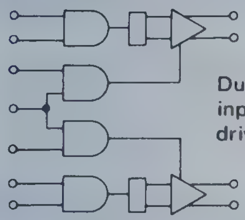
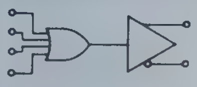
PLATED-WIRE MEMORIES

Function		Threshold Voltage (mV – typ)	Propagation Delay (ns – max)	Case	Type -55 to +125°C	0 to +75°C
 A B C D VOLTAGE REGULATOR DC LEVEL SHIFT STROBE CIRCUIT ONE OF FOUR DECODER	AC-coupled, decoded input channel selection, wired-OR output capability, output strobe capability, +5.0V, -6.0V power supply	1.0	25	620	MC1544	MC1444
 CHAN 4 CHAN 3 CHAN 2 CHAN 1 DC TRANS LATION REGU LATOR CLAMP 2 BY 4 DECODER 2nd STAGE STROBE CIRCUIT DC-coupled, decoded input, 0.5 mV input offset, output strobe capability, +5.0V, -6.0V power supply		4.0	18	620	–	MC1446

DRIVERS

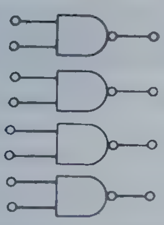
Several types of interface drivers are tabulated in this section: twisted-pair drivers for transmitting data over long lines, RS-232 drivers for interfacing modems and terminals, peripheral drivers for driving lamps, relays and memories, and MOS clock drivers for providing the required clock pulses to highly-capacitive loads.

TWISTED-PAIR LINE DRIVERS

Function	Compatibility	I_O(on) mA (min/max)	I_O(off) (μA – max)	t_{PLH}/t_{PHL} Input to Output (ns – typ)	Case	Type	
						-55 to +125°C	0 to +70°C
 Quad MC 75110 Type Driver with common inhibit input	MTTL	6.5/15	100	9.0/9.0	620 648	–	MC3453 •
 Dual Driver with inhibit inputs for party-line driver applications	MTTL	3.5/7.0	100	9.0/9.0	632, 646	–	MC75109
		6.5/15	100	9.0/9.0	632, 646	–	MC75110
 Differential Party-Line Driver with push-pull outputs	MDTL	±18/26	–	25/15	632	–	MC75113†

† 0 to +75°C Temperature Range

RS-232 LINE DRIVER

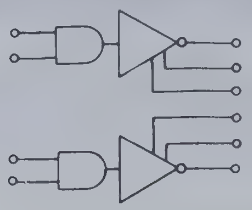
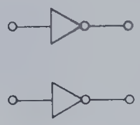
Function	Compatibility	V_{OL} Vdc min &	V_{OH} Vdc min &	V_{CC} Vdc &	V_{EE} Vdc	t_{PLH}/t_{PHL} ns typ	Case	Type 0 to +75°C
Quad Line Driver 	MDTL, MTTL	-6.0 -9.0	+6.0 +9.0	+9.0 +13.2	-9.0 -13.2	150/65*	632	MC1488

* @ 3000 ohms, 15 pF

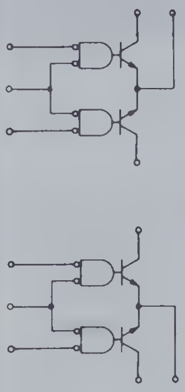
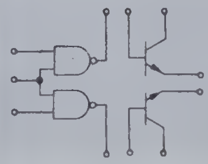
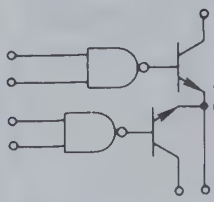
• To be announced

DRIVERS (continued)

MOS CLOCK DRIVERS

Function	Input Compatibility	PRR (max) C = 1000 pF	@ V_{CC}/V_{EE} (volts)	Switching Times C = 1000 pF, ns-typ t_{PLH}	t_{TLH}	t_{PHL}	t_{THL}	Temperature (°C)	Case	Type
Dual MOS Clock Driver with Strobe 	MDTL,MTTL	2.0 MHz	5.0/-20	75	75	50	50	-55 to +125	632	MC1585
Dual MOS clock Driver 	MTTL	–	0/-20	12	17	7.5	20	0 to +75	601 626 632	MMH0026C

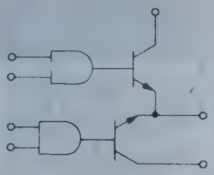
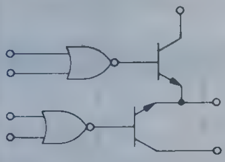
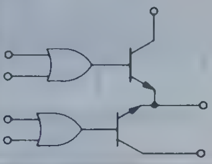
PERIPHERAL DRIVERS

Function	Compatibility	$I_{O(on)}$ (mA – max)	t_{PLH}/t_{PHL} Input to Output (ns – typ)	Case	Type -55 to +125°C	Type 0 to +70°C
 Dual Memory Driver with logic inputs, 24-volt output capability	MDTL,MTTL	600	25/25 (to source collectors) 20/20 (to sink outputs)	620, 648#	MC55325	MC75325
 Dual Peripheral Positive AND Driver, plus two noncommitted NPN output transistors	MDTL,MTTL	300*	21/16	632 646	–	MC75450
 Dual Peripheral Positive AND Driver with logic gate outputs internally connected to NPN output transistors	MDTL,MTTL	300*	17/18	626	–	MC75451

#Case 648 used with industrial-temperature-range devices only.
*Each transistor

DRIVERS (continued)

PERIPHERAL DRIVERS (continued)

Function		Compatibility	$I_{O(on)}$ (mA — max)	t_{PLH}/t_{PHL} Input to Output (ns — typ)	Case	Type	
						-55 to +125°C	0 to +70°C
	Dual positive NAND driver with logic gate outputs internally connected to NPN output transistors	MDTL, MTTL	300*	18/16	626	–	MC75452
	Dual positive OR Driver with logic gate outputs internally connected to NPN output transistors	MDTL, MTTL	300*	12/17	626	–	MC75453
	Dual positive NOR Driver with logic gate output internally connected to NPN output transistors	MDTL, MTTL	300*	25/19	626	–	MC75454

*Each Transistor

MOS-LED DISPLAY DRIVERS

Function	Sink Current (mA-max)	Source Current (mA-max)	t_{PLH}/t_{PHL} Input to Collector Output (ns - typ)	Collector Voltage (V - max)	Case	Type 0 to + 70° C
Quad Segment Driver	50	50	40 / 20	10	632 646	MC75491
Hex Digit Driver	250	– –	80 / 40	10	632 646	MC75492

D/A CONVERTERS

The low-cost D/A converters described here find wide usage in communications, control, and instrumentation systems. They provide a current output which is the product of a digital word and an analog reference voltage.

DIGITAL-TO-ANALOG CONVERTERS

Function	Compatibility	E_T (% — max)	I_O (mA — max)	t_S (ns — typ)	tp (ns — max)	Case	Type	
							-55 to +125°C	0 to +70°C
6-Bit Multiplying Digital-to-Analog Converters	MDTL, MTTL	±0.78	2.1	200	150	632	MC1506	MC1406
8-Bit Multiplying Digital-to-Analog Converters	MDTL, MTTL	±0.19 ±0.39 ±0.78	2.1 2.1 2.1	300 300 300	100 100 100	620 620 620	MC1508L8 – –	MC1408L8 MC1408L7 MC1408L6

A/D CONVERTERS

This analog-digital control circuit is useful in high-speed tracking A/D converters, window comparators, peak detecting sample and hold circuits.

ANALOG-DIGITAL CONTROL CIRCUIT

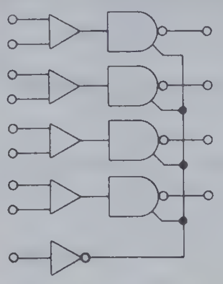
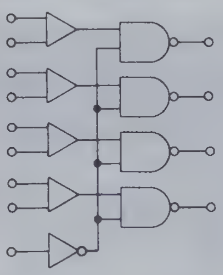
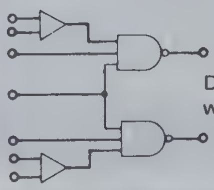
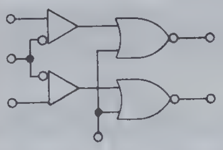
Amplifier Slew Rate $A_V = -1$ (V/μs - typ)	Amplifier Settling Time $A_V = -1$ (μs - typ)	Comparator Threshold V_{ref} = 40 mV (mV — min/max)	Comparator Bias Current (μA - max)	Case	Temperature (°C)	Type
20	0.8	±36/±44	1.5	620	-55 to +125	MC1507 •
20	0.8	±30/±50	2.5	620	0 to +70	MC1407 •

• To be announced

RECEIVERS

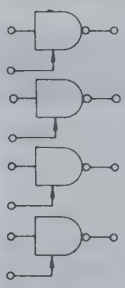
Mating with the driver types listed in the previous section are the receivers tabulated in this section: twisted-pair receivers for computer applications, and RS-232 receivers to interface with similar drivers.

TWISTED-PAIR LINE RECEIVERS

Function		Compatibility	Input Threshold (mV – typ)	Input Common Mode Range (V – min)	t_{PLH}/t_{PHL} Input to Output (ns – typ)	Case	Type	
							-55 to +125°C	0 to +70°C
 Quad Receiver with common 3-state strobe input, active pullup outputs (Quad MC75107 type)		MTTL	±25	±3.0	19/19	620 648	–	MC3450 ●
 Quad Receiver with common strobe input, open collector outputs (Quad MC75108 type)		MTTL	±25	±3.0	19/19	620 648	–	MC3452 ●
 Dual Line Receiver with strobe inputs	Active Pullup Outputs	MTTL	±25	±3.0	17/17	632, 646#	MC55107	MC75107
	Open Collector Outputs	MTTL	±25	±3.0	19/19	632, 646#	MC55108	MC75108
 Dual Single-Ended Receiver with common reference input		MTTL	±100	5.5	22/22	626	–	MC75140 ●

#Case 646 used with industrial-temperature-range devices only.

RS-232 LINE RECEIVERS

Function	Compatibility	Input Turn-On Threshold (Vdc – max)	Input Turn-Off Threshold (Vdc – max)	Input Hysteresis (mV – typ)	t_{PLH}/t_{PHL} (ns – typ)	Case	Type 0 to +75°C
 Quad Line Receiver	MDTL,MTTL MDTL,MTTL	1.5 2.25	1.25 1.25	250 1150	25/25 25/25	632 632	MC1489 MC1489A

● To be announced

COMPARATORS

A comparator provides a logical output in response to the polarity of the differential voltage applied to the inputs of the device. All comparators shown are intended for operation from +12 V and -6.0 V power supplies, and interface to saturated logic levels. Maximum differential input voltage is ±5.0 V and propagation delay time is 40 ns for all device types shown.

A_{vol} (V/V min)	V_{IO} (mVdc max)	I_{IB} (µAdc max)	V_{OH} (Vdc)		V_{OL} (Vdc)		I_{Os} (mAdc min)	tp (ns typ)	Case	Type	Features
			min	max	min	max					
-55 to +125°C Temperature Range											
1,250	2.0	20	2.5	4.0	-1.0	0	2.0	40	601,606,632	MC1710* **	Output impedance = 200 ohms
1,250	2.0	20	2.5	4.0	-1.0	0	2.8	40	632	MC1514	Dual, strobe capability
750	3.5	75	2.5	5.0	-1.0	0	0.5	40	603-02,606, 632	MC1711*	Dual with outputs wired OR, strobe capability
0 to +75°C Temperature Range											
1,000	5.0	25	2.5	4.0	-1.0	0	1.6	40	601,606, 632,646	MC1710C*	Output impedance = 200 ohms
1,000	5.0	25	2.5	4.0	-1.0	0	1.6	40	632,646	MC1414	Dual, strobe capability
700	5.0	100	2.5	5.0	-1.0	0	0.5	40	603-02,606, 632,646	MC1711C*	Dual with outputs wired OR strobe capability

QUAD COMPARATOR

V_{IO} (mVdc max)	I_{IB} (µAdc max)	V_{OL} (Vdc max)	Output Leakage Current (µA max)	I_{Os} (mAdc typ)	V_{IDR} (Vdc max)	Case	Type
-40 to +85°C Temperature Range							
20	0.5	0.4	10	5.0	$\pm V_{CC}$	646	MC3302

Features

These comparators are designed specifically for single positive-power-supply operation from +2.0 to +28 Vdc. Each monolithic device contains four independent comparators, yet total package power supply current drain is 1.5 mA max.

*Use MCC prefix for nonencapsulated chip.

**Use MCBC prefix for nonencapsulated beam-lead device; use MCB prefix for beam-lead device in ceramic flat package.

DEFINITIONS

A_{vol}	Open-Loop Voltage Gain	V_{OH}	Positive Output Voltage
V_{ID}	Differential Voltage Range	V_{OL}	Negative Output Voltage
V_{IO}	Input Offset Voltage	I_{Os}	Output Sink Current
I_{IB}	Input Bias Current	tp	Propagation Delay Time

HIGH-FREQUENCY AMPLIFIERS

Motorola's high-frequency amplifiers simplify the design of receivers and signal processors. Many offer AGC capability or several gain options to provide extra design flexibility.

HIGH-FREQUENCY AMPLIFIERS

Bandwidth (MHz)	V_{OS} (Vp-p)	$\lvert z_{in}\rvert$ (kΩ @ kHz)		$\lvert z_o\rvert$ (Ω @ kHz)		A_{VS} (dB)	G_P @ 60 MHz (dB)	Diff. Input and Output	AGC	V_{CC}, V_{EE} (Vdc)	Case	Type	
												-55 to +125°C	0 to +75°C
dc to 40	4.5	6.0	20	35	20	90 (fixed)	–	Yes	No	±6.0	601	MC1510	MC1410
dc to 75	2.5	10	50	25	50	18 (fixed)	–	Yes	Yes	±5.0	602A, 607, 632	MC1545	MC1445
22 min	6.0	1.8	1.0 M	100 k	1.0 M	26 (AGC = 0)	25	No	Yes	+6.0	602B, 606	MC1550	–
40 @ A_V = 34 dB 35 @ A_V = 40 dB	4.2	10	100	16	100	30 – 40 (fixed)	–	No	No	+6.0	602B	MC1552	–
35 @ A_V = 46 dB 15 @ A_V = 52 dB	4.2	10	100	16	100	46 – 52 (fixed)	–	No	No	+6.0	602B	MC1553	–
100 @ A_V = 4.0 dB 60 @ A_V = 25 dB	7.0	3.0	1.0 M	100 k	1.0 M	44 (AGC = 0)	45	Yes	Yes	+12	601	MC1590	–
40 @ A_V = 52 dB 90 @ A_V = 40 dB 120 @ A_V = 20 dB	4.0	4.0 30 250	1.0 1.0 1.0	20	1.0	52 40 20	–	Yes	No	±6.0	603-02 632	MC1733	MC1733C

REGULATORS

Motorola offers a broad line of voltage regulators ranging from low-cost "Functional Circuits" to high-precision units. Regulators for positive and negative voltages are available as well as a unique floating regulator, type MC1566L, whose maximum output voltage and current are limited only by the external pass transistor.

POSITIVE VOLTAGE REGULATORS

V_O Vdc		I_O (mAdc max)	$\|V_{in}-V_O\|$ (Vdc)		V_{in} (Vdc)		I_{IB} (mAdc max)	Reg_{in} %V_O/V_{in} (max)	Reg_L (%V_O max)	P_D (W max)		Case	Type
min	max		min	max	min	max				T_C = 25°C	T_A = +25°C		
-55 to +125°C Temperature Range													
4.5	40	20	3.0	30	8.5	50	2.0	0.06	0.05 mV	–	0.68	601	MLM105
2.5	37	200 500	2.7	40	8.5	40	9.0	0.015	0.13 0.05	1.8 17.5	0.68 3.0	602A 614	MC1569*
2.5	37	200 500	2.7	40	8.5	40	9.0	0.015	0.13 0.05	1.8 17.5	0.68 3.0	602A 614	MC1561
2.5	17	200 500	2.7	20	8.5	20	9.0	0.015	0.13 0.05	1.8 12	0.68 3.0	602A 614	MC1560
2.0	37	150	3.0	38	9.5	40	3.5	0.030	0.15	–	0.8	603-03, 632,607**	MC1723* **
-25 to +85°C Temperature Range													
4.5	40	20	3.0	30	8.5	50	2.0	0.06	0.05 mV	–	0.68	601	MLM205
-10 to +75°C Temperature Range													
4.6	32	200	3.0	–	9.0	35	–	0.03	0.2	–	1.0	206A	MFC4060A
4.6	32	200	3.0	–	9.0	35	–	0.03	0.2	–	1.0	643A	MFC6030A
4.6	32	200	3.0	–	9.0	35	–	0.06	0.4	–	1.0	206A	MFC4062A
4.6	32	200	3.0	–	9.0	35	–	0.06	0.4	–	1.0	643A	MFC6032A
4.6	17	200	3.0	–	9.0	20	–	0.03	0.2	–	1.0	206A	MFC4063A
4.6	17	200	3.0	–	9.0	20	–	0.03	0.2	–	1.0	643A	MFC6033A
4.6	17	200	3.0	–	9.0	20	–	0.06	0.4	–	1.0	206A	MFC4064A
4.6	17	200	3.0	–	9.0	20	–	0.06	0.4	–	1.0	643A	MFC6034A
0 to +70°C Temperature Range													
4.5	30	20	3.0	30	8.5	40	2.0	0.06	0.05 mV	–	0.68	601	MLM305
2.5	32	200 500	3.0	35	9.0	35	12	0.030	0.13 0.05	1.8 17.5	0.68 3.0	602A 614	MC1469*
2.5	32	200 500	3.0	35	9.0	35	12	0.030	0.13 0.05	1.8 17.5	0.68 3.0	602A 614	MC1461
2.5	17	200 500	3.0	20	9.0	20	12	0.030	0.13 0.05	1.8 12	0.68 3.0	602A 614	MC1460
2.0	37	150	3.0	38	9.5	40	4.0	0.030	0.20	–	0.8	603-03, 632	MC1723C*

*Also available as nonencapsulated chip. use MCC prefix.

**Also available as nonencapsulated beam-lead device; use MCBC prefix, use MCB prefix for device in ceramic flat package.

FIXED OUTPUT POSITIVE VOLTAGE REGULATORS

V_O (Vdc)		I_O (mAdc max)	$\lvert V_{in}-V_O \rvert$ (Vdc)		V_{in} (Vdc)		I_{IB} (mAdc max)	Reg_{in} (mV max)	Reg_L (mV max)	P_D (W max)		Case	Type
min	max		min	max	min	max				$T_C = +25°C$	$T_A = +25°C$		
-55 to +150°C Junction Temperature Range													
4.7	5.3	1000 200	2.0	30	7.0	35	10	50	100 50	20 2.0	3.5 0.8	11 79	MLM109
-25 to +125°C Junction Temperature Range													
4.7	5.3	1000 200	2.0	30	7.0	35	10	50	100 50	20 2.0	3.5 0.8	11 79	MLM209
0 to +125°C Junction Temperature Range													
4.8	5.2	1000 200	5.0	30	7.0	35	10	50	100 50	20 2.0	3.5 0.8	11 79	MLM309
4.8	5.2	1500	2.0	30	7.0	35	8.0	100	100	15	2.0 2.5	199-04 11	MC7805C
5.75	6.25	1500	2.0	29	8.0	35	8.0	120	120	15	2.0 2.5	199-04 11	MC7806C
7.7	8.3	1500	2.5	27	10.5	35	8.0	160	160	15	2.0 2.5	199-04 11	MC7808C
11.5	12.5	1500	2.5	23	14.5	35	8.0	240	240	15	2.0 2.5	199-04 11	MC7812C
14.4	15.6	1500	2.5	20	17.5	35	8.0	300	300	15	2.0 2.5	199-04 11	MC7815C
17.3	18.7	1000	3.0	17	21	35	8.0	360	360	15	2.0 2.5	199-04 11	MC7818C
23	25	1000	3.0	16	27	40	8.0	480	480	15	2.0 2.5	199-04 11	MC7824C

DUAL VOLTAGE REGULATORS

V_{OR}† (Vdc)		I_O (mAdc max)	$\lvert V_{in}-V_O \rvert$ (Vdc)	V_{in} (Vdc)		I_{IB} (mAdc max)	Reg_{in} $\%V_O/V_{in}$ (max)	Reg_L ($\%V_O$ max)	P_D (W max)		Case	Type
min	max		min	min	max				$T_C = 25°C$	$T_A = 25°C$		
-55 to +125°C Temperature Range												
±14.8	±15.2	100†	2.0	±17.2	±30	+4.0,-3.0	0.006	0.07	2.1 2.5 9.0	0.8 1.0 2.4	603-03 632 614	MC1568
0 to +75°C Temperature Range												
±14.5	±15.5	100†	2.0	±17.5	±30	+4.0,-3.0	0.01	0.07	2.1 2.5 9.0	0.8 1.0 2.4	603-03 632 614	MC1468

†Preset Voltage Range; range is adjustable by adding external resistors from ±8.0 to ±20 Vdc.

NEGATIVE VOLTAGE REGULATORS

V_O (Vdc)		I_O (mAdc max)	$\|V_{in}-V_O\|$ (Vdc)		V_{in} (Vdc)		I_{IB} (mAdc max)	Reg_{in} $\%V_O/V_{in}$ (max)	Reg_L ($\%V_O$ max)	P_D (W max)		Case	Type
min	max		min	max	min	max				T_C = 25°C	T_A = +25°C		
-55 to +125°C Temperature Range													
-3.6	37	200 500	-2.7	35	-8.5	-40	11	0.015	0.13 0.05	1.8 9.0	0.68 2.4	602A 614	MC1563*
-0.015	-40	20	2.0	50	-8.0	-50	5.0	0.1	0.05	1.8	0.68	603-02	MLM104
-25 to +85°C													
-0.015	-40	20	2.0	50	-8.0	-50	5.0	0.1	0.05	1.8	0.68	603-02	MLM204
0 to +70°C Temperature Range													
-3.8	-32	200 500	-3.0	40	-9.0	-35	14	0.030	0.13 0.05	1.8 9.0	0.68 2.4	602A 614	MC1463*
-0.035	-30	20	2.0	40	-8.0	-40	5.0	0.1	0.05	1.8	0.68	603-02	MLM304

*Also available as nonencapsulated chip, use MCC prefix.

FIXED OUTPUT NEGATIVE VOLTAGE REGULATORS

V_O (Vdc)		I_O (mAdc max)	$\|V_{in}-V_O\|$ (Vdc)		V_{in} (Vdc)		I_{IB} (mAdc max)	Reg_{in} (mV max)	Reg_L (mV max)	P_D (W max)		Case	Type
min	max		min	max	min	max				T_C = +25°C	T_A = +25°C		
0 to +125°C Junction Temperature Range													
-1.92	-2.08	1500	2.0	33	7.2	-35	8.0	40	120	15	2.0 2.5	199-04 11	MC7902C•
-4.8	-5.2	1500	2.0	30	7.0	-35	8.0	100	100	15	2.0 2.5	199-04 11	MC7905C•
-5.0	-5.4	1500	5.0	29.8	7.0	-35	8.0	105	105	15	2.0 2.5	199-04 11	MC7905.2C•
-5.75	-6.25	1500	2.0	29	8.0	-35	8.0	120	120	15	2.0 2.5	199-04 11	MC7906C•
-7.7	-8.3	1500	2.5	27	10.5	-35	8.0	160	160	15	2.0 2.5	199-04 11	MC7908C•
-11.5	-12.5	1500	2.5	23	14.5	-35	8.0	240	240	15	2.0 2.5	199-04 11	MC7912C•
-14.4	-15.6	1500	2.5	20	17.5	-35	8.0	300	300	15	2.0 2.5	199-04 11	MC7915C•
-17.3	-18.7	1000	3.0	17	21	-35	8.0	360	360	15	2.0 2.5	199-04 11	MC7918C•
-23	-25	1000	3.0	16	27	-40	8.0	480	480	15	2.0 2.5	199-04 11	MC7924C•

SPECIAL-PURPOSE REGULATORS

V_O		Reg_{in} (max)	Reg_L (max)	Current Regulation	P_D (W max)	Case	Type	Features
min	max							
-55 to +125°C Temperature Range								
0	1000*	0.01% +1mV	0.01% +1mV	0.1% +1mA	0.300	632	MC1566	A floating regulator, can be used as a voltage controlled current source.
0 to +75°C Temperature Range								
0	1000*	0.03% +3mV	0.03% +3mV	0.02% +1mA	0.360	632	MC1466	A floating regulator, can be used as a voltage controlled current source.

*Limited only by the characteristics of the external series pass transistor.

•To be announced.

SPECIAL-PURPOSE CIRCUITS

The linear-integrated-circuits listed in this section were developed by Motorola for the system design engineer to fill special-purpose requirements as indicated by the subheadings. Temperature ranges and package availability are also tailored to provide versatility.

MULTIPLIERS

Function	Linearity Error (typ)	Input Voltage Range (Vdc min)	Case	Type	
				-55 to +125°C	0 to +70°C
A four-quadrant multiplier designed to operate with ±15-volt supplies; has internal level-shift circuitry and voltage regulator.	±0.3%	±10	620	MC1594	–
	±0.5%	±10	620	–	MC1494
Applications include multiply, divide, square root, mean square, phase detector, frequency doubler, balanced modulator/demodulator, electronic gain control.	X Input = 0.5% Y Input = 1.0%	±10	632	MC1595*	–
	X Input = 1.0% Y Input = 2.0%	±10	632	–	MC1495*

*Also available as a nonencapsulated chip, use MCC prefix.

BALANCED MODULATOR/DEMODULATOR

Function	Carrier Suppression dB @ f (MHz) (typ)		Common-Mode Rejection (dB typ)	Case	Type	
					-55 to +125°C	0 to +75°C
Balanced modulator/demodulator designed for use where the output voltage is a product of an input voltage (signal) and a switching function (carrier).	65 50	0.5 10	85	602A, 632	MC1596	MC1496

LOW-FREQUENCY CIRCUITS

Function	Output Power (W typ)	Voltage Gain – typ (V/V typ)	Total Harmonic Distortion (% typ)	Case	Type	
					-55 to +125°C	0 to +70°C
A power amplifier device capable of single or split supply operation.	1.0	10, 18, 36	0.4	602B	MC1554	MC1454

POWER-CONTROL CIRCUITS

Function	Temperature	Case	Type
Zero voltage switch for use in ac power switching with output capable of triggering triacs.	-10 to +75°C	644A	MFC8070

TIMING CIRCUIT

Function	Supply Voltage V_{CC} (Vdc – max)	Initial Timing Error V_{CC} = 5 & 15 V, C = 0.1 μF (%-typ)	V_{OL} V_{CC} = 15 V I_{sink} = 50 mA (Vdc – max)	V_{OH} V_{CC} = 15 V I_{source} = 100 mA (Vdc – min)	Case	Type	
						-55 to +125°C	0 to +75°C
Wide range adjustable timers	16	1.0	0.75	12.75	601, 626	–	MC1455
	18	0.5	0.5	13	601	MC1555	–

CONSUMER APPLICATION SELECTOR GUIDE

. . .reflecting Motorola's continuing commitment to semiconductor products necessary for consumer system designs. The tabulation contains data for a large number of components designed principally for entertainment product applications. It is arranged to simplify first-order of linear integrated circuit device lineups to satisfy primary functions for Television, Audio, Radio, Automotive and Organ applications.

TELEVISION CIRCUITS

Function	Features	Case	Type
SOUND			
Sound IF, Detector, Limiter, Audio Preamplifier	80 μV, 3 dB Limiting Sensitivity, 3.5 V(RMS) Output, Sufficient for Single Transistor Output Stage	646,647	MC1351
Sound IF Detector	Interchangeable with ULN2111A	646,647	MC1357
Sound IF Detector, DC Volume Control, Preamplifier	Excellent AMR, Interchangeable with CA3065	646,647	MC1358
VIDEO			
1st and 2nd Video IF Amplifier	IF Gain @ 45 MHz – 60 dB typ AGC Range – 70 dB min	626	MC1349
	IF Gain @ 45 MHz – 46 dB typ, AGC Range – 60 dB min	626	MC1350
1st and 2nd Video IF, AGC Keyer and Amplifier	IF Gain @ 45 MHz – 53 dB typ, AGC Range – 65 dB min, "Forward AGC" Provided for Tuner	646,647	MC1352
	Same as MC1352, with Opposite AGC for Tuner	646	MC1353
3rd IF and Video Detector	Low-Level Detection, Low Harmonic Generation, Reduced Circuit Cost and Complexity, Reduced Shielding	626	MC1330
AGC Keyer, AGC Amplifier, Noise Gate, Sync Separator	High-Quality Noise Gate, One IF AGC Output and Two Tuner AGC Outputs, Adjustable AGC Delay	646	MC1345
Automatic Fine Tuning	High Gain AFT System, Interchangeable with CA3064	646 686	MC1364
CHROMA			
Chroma IF Amplifier and Subcarrier System	Includes Complete Chroma IF, AGC, dc Gain and Tint Controls, Injection Locked Oscillator, Low Peripheral Parts Count	646	MC1398
Chroma Subcarrier System	Interchangeable with CA3070, APC Chroma Reference System	648	MC1370
Chroma IF Amplifier	Interchangeable with CA3071, Automatic and Manual Gain Control	646	MC1371
Dual Chroma Demodulators	Industry Standard Demodulator, Low Differential Output dc Drift	603-02 646, 647	MC1328
	Same as MC1328 with short-circuit protected outputs, and improved dc tracking and temperature coefficients on outputs.	646	MC1329
	Similar to MC1328 but with Luminance and Blanking Inputs, Internal Matrix Provides RGB Outputs	646-647	MC1326
	Same as MC1326 with short-circuit protected outputs, and improved dc tracking and temperature coefficients on outputs.	646	MC1324
	Dual Doubly Balanced Demodulator with RGB Output Matrix and PAL Switch	646,647	MC1327
DEFLECTION			
Horizontal Processor	Includes Phase-Detector, Oscillator and Predriver; Linear Balanced Phase Detector; Adjustable dc Loop Gain	626	MC1391

AUDIO CIRCUITS

PREAMPLIFIERS

Function	V_{CC} (Vdc – max)	A_{vol} (dB min)	THD (% typ)	z_o (Ohms typ)	Case	Type
Dual Preamplifier	±15	80	0.1	100	632	MC1303
Dual Low-Noise Preamplifier	16	63	0.1	100	646	MC1339
Low-Noise Preamplifier	33	80	0.1	100	644A	MFC8040

DRIVERS

Function	V_{CC} (Vdc)	Drive Current (mA)	A_{vol} (dB)	Case	Type
Class A Audio Driver	18	30 min	42 min	206A	MFC4050
Class B Audio Drivers	35	150 peak	89 typ	644A	MFC8020A
	20	150 peak	87 typ	644A	MFC8021A
	45	150 peak	90 typ	644A	MFC8022A

POWER AMPLIFIERS

Function	P_O (Watts)	V_{CC} (Vdc max)	e_{in} @ rated P_O (mV – max)	P_D (mA – max)	R_L (Ohms)	Case	Type
Audio Power Amplifiers	0.5	12	3.0	4.0	8.0	626	MC1306
	0.25	12	3.0	3.5	16	206A	MFC4000B
	1.0	20	100	5.0	16	643A	MFC6070
	1.0	22	10	10	8.0	644A	MFC8010
	2.0	24	200	12	16	641A	MFC9020

RADIO CIRCUITS

IF AMPLIFIERS

Function	Gain @ 10.7 MHz (dB – typ)	3 dB Limiting @ 10.7 MHz (mV(RMS) typ)	AMR (dB – typ)	Recovered Audio Output Δf = 75 kHz (mV(RMS)	Power Supply (Volts – max)	Case	Type
IF Amplifier	58	–	–	–	18	626	MC1350
Limiting FM-IF Amplifier	–	0.175	60	690	18	646,647	MC1355
Limiting IF Ampl/Quadrature Detector	53	0.600	45	480	16	646,647	MC1357
IF Amplifier	42	0.4	–	–	18	206A	MFC4010A
IF Amplifier, Nonsaturating Limiter	40	60	50	500	20	643A	MFC6010
IF Amplifier, Limiter, Detector, Audio Preamplifier	21	0.25	55	625	16	646	MC1375

DECODERS

Function	Channel Separation (dB – typ)	THD (% – typ)	Stereo – Indicator Lamp Driver (mA – max)	Features	Case	Type
FM Multiplex Stereo Decoders	45	0.5	40	Audio Muting	646	MC1304
	45	0.5	40	Audio Muting	646	MC1305
	40	0.5	40	–	646/647	MC1307
	40	0.3	75	Coilless Operation	646	MC1310
Four-Channel SQ* Decoders	45	0.1	–	V_{CC} = 20 Vdc nom	646	MC1312
	45	0.25	–	V_{CC} = 12 Vdc nom	646	MC1313

*Trademark of Columbia Braodcasting Systems Inc.

AUTOMOTIVE CIRCUITS

OPERATIONAL AMPLIFIER

Function	V_{CC} Range (Vdc)	A_{vol} (V/mV – typ)	I_{IB} (μA – max)	Unity Gain Bandwidth (MHz – typ)	R_{in} (MegΩ typ)	Case	Type
Quad Operational Amplifier	4.0 to 28	2.0	0.3	4.0	1.0	646	MC3301

COMPARATOR

Function	V_{CC} Range (Vdc)	V_{IDR} (Vdc)	I_{IB} (μA-max)	Output Leakage Current (μA-max)	Sink Current	Case	Type
Quad Comparator	2.0 to 28	$\pm V_{CC}$	0.5	1.0	6.0	646	MC3302

ORGAN CIRCUITS

FREQUENCY DIVIDERS

Function	V_{CC} Range (Vdc)	f_{Tog} (MHz – typ)	V_{OH} (Vdc – min)	Case	Type
Toggle Flip-Flop	4.0 to 16	3.0	15.5	206A	MFC4040
Dual Toggle Flip-Flop	4.0 to 16	3.0	15.5	643A	MFC6020

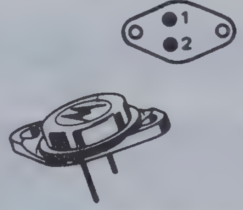
RHYTHM

Function	V_{CC} Range (Vdc)	f_{Tog} (MHz – typ)	V_{OH} (Vdc – min)	Case	Type
Dual Toggle Flip-Flop with Reset	4.0 to 16	3.0	15.5	643A	MFC6050
3-Input AND Gate	4.0 to 16	–	15	643A	MFC6060
R-S Flip-Flop	4.0 to 16	1.0	15.5	643A	MFC6080
J-K Flip-Flop	4.0 to 16	1.0	15.5	644A	MFC8050

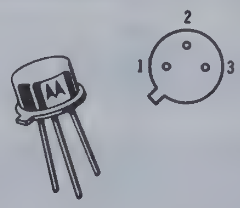
ATTENUATOR

Function	V_{CC} Range (Vdc)	THD (% – typ)	A_V (dB – typ)	Attenuation Range (dB – typ)	Case	Type
Electronic Attenuator	9.0 to 18	0.6	13	90	643A	MFC6040

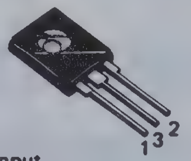
LINEAR IC PACKAGES



CASE 11 (TO-3)
No Suffix

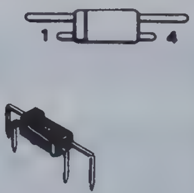


CASE 79-02 (TO-39)
Suffix G after type number

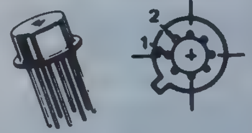


Pin 1 Input
Pin 2 Output
Pin 3 Ground

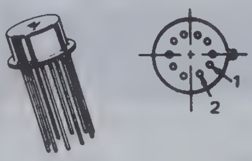
CASE 199-04
Suffix P after type number



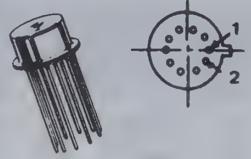
CASE 206A
No Suffix



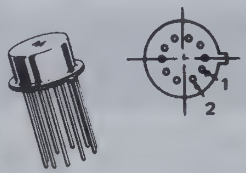
CASE 601
Suffix G after type number



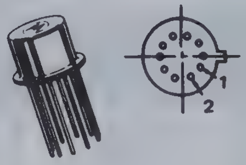
CASE 602A
Suffix G after type number



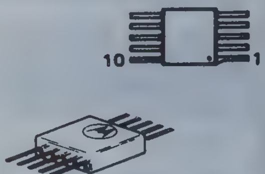
CASE 602B
Suffix G after type number



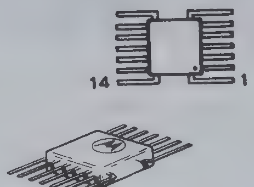
CASE 603-02 (TO-100)
Suffix G after type number



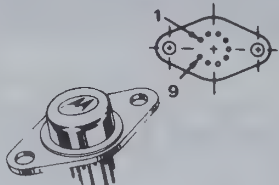
CASE 603-03
Suffix G after type number



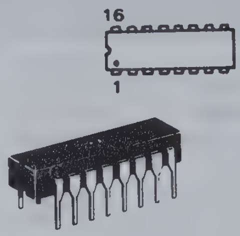
CASE 606 (TO-91)
Suffix F after type number



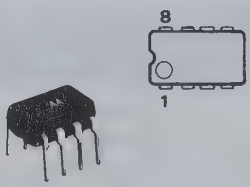
CASE 607
Suffix F after type number



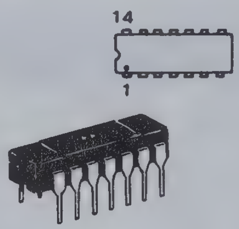
CASE 614
Suffix R after type number



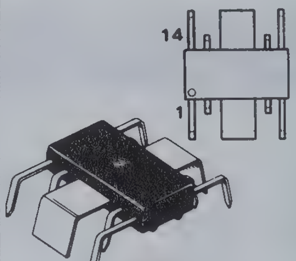
CASE 620
Suffix L after type number



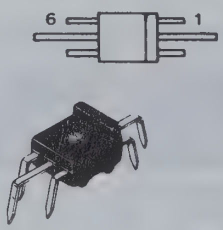
CASE 626
Suffix P after type number



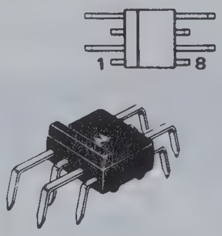
CASE 632 (TO-116)
Suffix L after type number



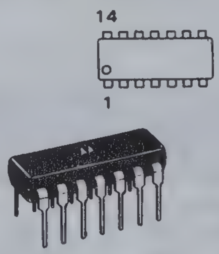
CASE 641
No Suffix



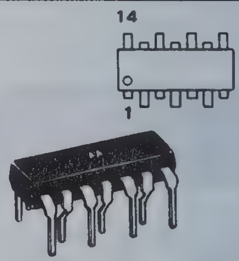
CASE 643A
No Suffix



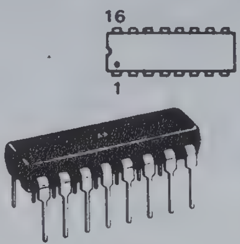
CASE 644A
No Suffix



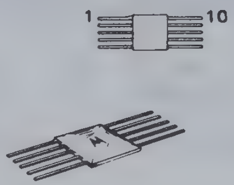
CASE 646
Suffix P after type number



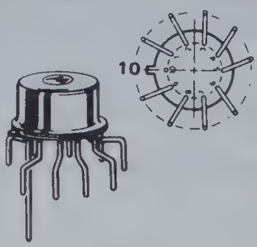
CASE 647
Suffix PQ after type number



CASE 648
Suffix P after type number



CASE 665
Suffix F after type number



CASE 686
Suffix G after type number

PACKAGING and HARDWARE

PACKAGING

Lead Tape Packaging Standards for Axial-Lead Components Page 8–2

HARDWARE

MH745
MH746 Rectifier – zener diode mounting hardware Page 8–4

MK10
MK15
MK20
MK25
MK30
MK35 Power transistor mounting hardware Page 8–5

MS-10
MS-15 Power transistor heat sink Page 8–11

LEAD TAPE PACKAGING STANDARDS FOR AXIAL-LEAD COMPONENTS

1.0 SCOPE

This document covers packaging requirements for the following axial-lead components for use in automatic testing and assembly equipment: Motorola Case 51 (DO-7), Case 52 (DO-13), Case 59 (DO-41), Case 267, and Case 17. Packaging, as covered in this document, shall consist of axial-lead components mounted by their leads on pressure-sensitive tape, either wound onto a reel or folded in an oriented manner in a container (ammunition pack).

2.0 PURPOSE

This document establishes Motorola standard practices for lead-tape packaging of axial-lead components and meets the requirements of EIA Standard RS-296-B, "Reel Packaging of Components with Axial Leads."

3.0 REQUIREMENTS

3.1 Component Leads

3.1.1 Component leads shall not be bent beyond 0.047 inch from their nominal position. See Figure 2.

3.1.2 The "C" dimension shall be governed by the overall length of the reel packaged component. The distance between flanges shall be 0.125 inch to 0.250 inch greater than the overall component length. See Figures 2 and 3.

3.2 Orientation

All polarized components must be oriented in one direction. The cathode lead tape shall be blue, and the anode tape shall be white. See Figure 1.

3.3 Reeling

3.3.1 Components on any reel shall not represent more than two date codes when date code identification is required.

3.3.2 Component leads shall be positioned perpendicularly between pairs of 0.250 inch tape. See Figure 2.

3.3.3 A minimum 12 inch leader of tape shall be provided before the first and last component on the reel.

3.3.4 50 lb. Kraft paper must be wound between layers of components as far as necessary for component protection. Width of paper is 0.062 inch to 0.750 inch less than "C" dimension of reel. See Figure 3.

3.3.5 A row of components must be centered between the tapes ± 0.047 inch. In addition, individual components may deviate from center of component row ± 0.031 inch. See Figure 2.

3.3.6 Staples shall not be used for splicing. No more than 4 layers of tape shall be used in any splice area and no tape shall be offset from another by more than 0.031 inch noncumulative. Tape splices shall overlap at least 6 inches for butt joints and at least 3 inches for lap joints, and shall not be weaker than unspliced tape.

3.3.7 Quantity per reel shall be as indicated in Table 1. When reeling quantity is less than the established minimum of a suitable sized reel, an ammunition pack will be used. Quantities less than the ammunition pack minimum will not be lead-taped.

3.3.8 A maximum of 10 components may be missing from any 10 foot section. A maximum of 2 consecutive components may be missing, provided this gap is followed by 6 consecutive components.

3.3.9 The single face roll pad shall be placed around the finished reel and taped securely. Each reel shall then be placed in an appropriate container.

3.4 Marking

Minimum reel and carton marking shall consist of the following: See Figure 3.

Customer Part Number
Purchase Order Number
Quantity
Date of Reeling (when applicable)
Manufacturer's Name
Electrical Value (when applicable)
Date Codes (when applicable; see Note 3.3.1)
Tape (when applicable)

4.0 EXCEPTIONS

Requirements differing from this Motorola standard shall be negotiated with the factory.

LEAD TAPE PACKAGING STANDARDS FOR AXIAL-LEAD COMPONENTS (continued)

TABLE 1 – PACKAGING

Component Type (Case)	Quantity Per Reel Min/Max	Ammunition Pack Qty. Min	Component Spacing A	Tape Spacing B	Reel Dimensions C	Reel Dimensions D
Case 51 (DO-7) Case 59 (DO-41)	1000/3000	500	0.200 ± 0.015	2.00 ± 0.010	3.00	10.50
Case 17	1000/2000	500	0.200 ± 0.015	2.00 ± 0.010	3.00	10.50
Case 52 (DO-13)	500/1500	250	0.375 ± 0.015	2.375 ± 0.020	3.81	14.00
Case 267	500/900	250	0.375 ± 0.015	2.00 ± 0.010	3.00	10.50

FIGURE 1 – REEL PACKING

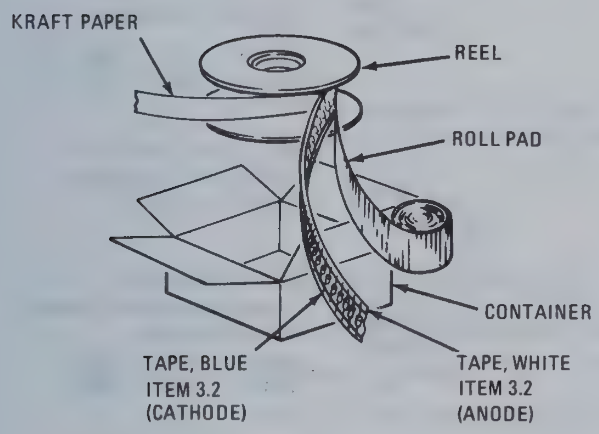

KRAFT PAPER
REEL
ROLL PAD
CONTAINER
TAPE, BLUE
ITEM 3.2
(CATHODE)
TAPE, WHITE
ITEM 3.2
(ANODE)

FIGURE 2 – COMPONENT SPACING

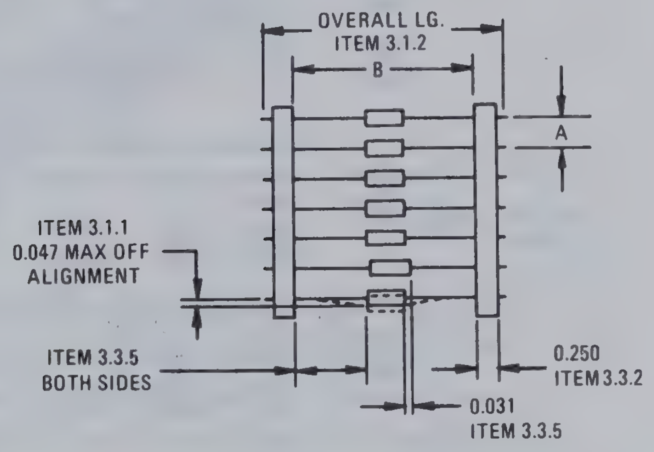

OVERALL LG.
ITEM 3.1.2
B
A
ITEM 3.1.1
0.047 MAX OFF
ALIGNMENT
ITEM 3.3.5
BOTH SIDES
0.250
ITEM 3.3.2
0.031
ITEM 3.3.5

FIGURE 3 – REEL DIMENSIONS

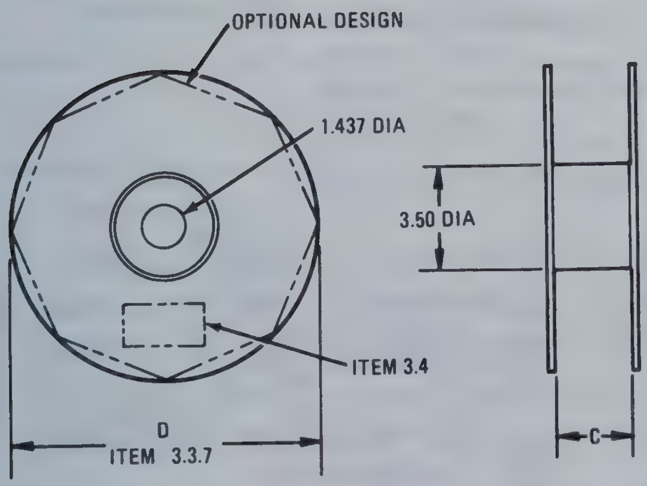
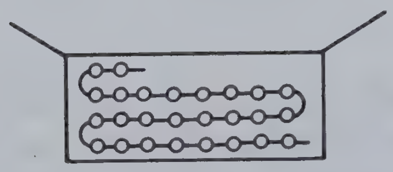

OPTIONAL DESIGN
1.437 DIA
3.50 DIA
ITEM 3.4
D
ITEM 3.3.7
C

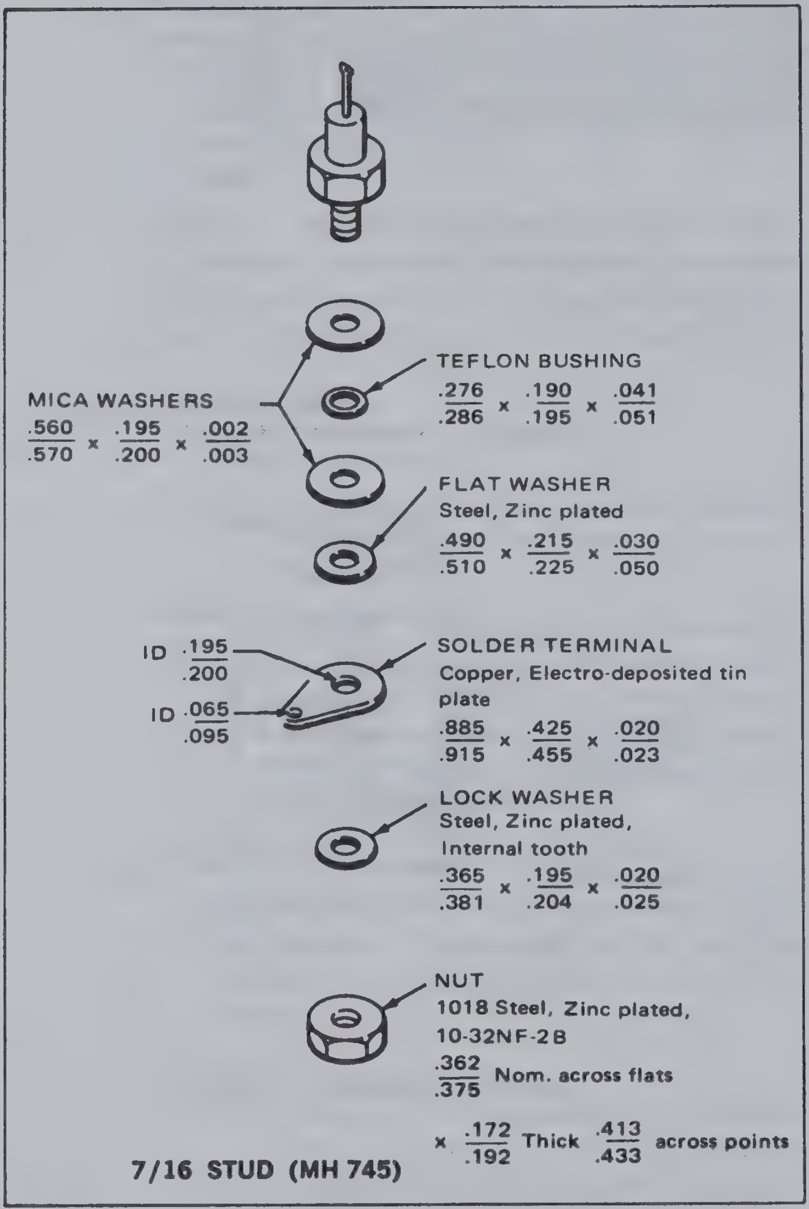
FIGURE 4 – AMMUNITION PACK



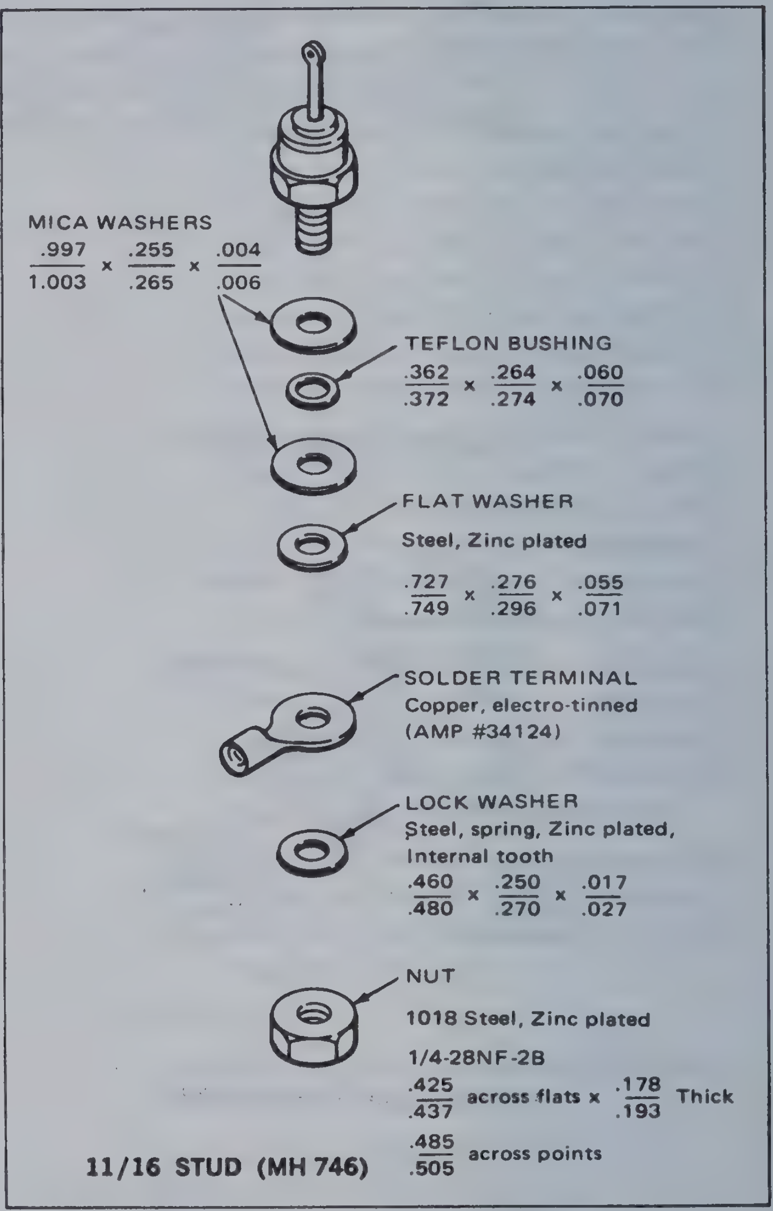
MH745
MH746

MOUNTING HARDWARE for MOTOROLA STUD PACKAGES

7/16" RECTIFIER and 10 WATT ZENER DIODE
11/16" RECTIFIER and 50 WATT ZENER DIODE


MICA WASHERS
$\frac{.560}{.570} \times \frac{.195}{.200} \times \frac{.002}{.003}$
TEFLON BUSHING
$\frac{.276}{.286} \times \frac{.190}{.195} \times \frac{.041}{.051}$
FLAT WASHER
Steel, Zinc plated
$\frac{.490}{.510} \times \frac{.215}{.225} \times \frac{.030}{.050}$
ID $\frac{.195}{.200}$
ID $\frac{.065}{.095}$
SOLDER TERMINAL
Copper, Electro-deposited tin plate
$\frac{.885}{.915} \times \frac{.425}{.455} \times \frac{.020}{.023}$
LOCK WASHER
Steel, Zinc plated, Internal tooth
$\frac{.365}{.381} \times \frac{.195}{.204} \times \frac{.020}{.025}$
NUT
1018 Steel, Zinc plated, 10-32NF-2B
$\frac{.362}{.375}$ Nom. across flats
$\times \frac{.172}{.192}$ Thick $\frac{.413}{.433}$ across points

7/16 STUD (MH 745)

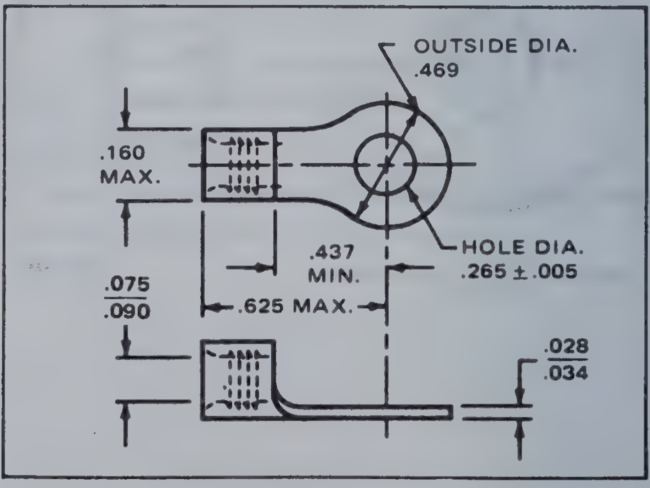

MICA WASHERS
$\frac{.997}{1.003} \times \frac{.255}{.265} \times \frac{.004}{.006}$
TEFLON BUSHING
$\frac{.362}{.372} \times \frac{.264}{.274} \times \frac{.060}{.070}$
FLAT WASHER
Steel, Zinc plated
$\frac{.727}{.749} \times \frac{.276}{.296} \times \frac{.055}{.071}$
SOLDER TERMINAL
Copper, electro-tinned
(AMP #34124)
LOCK WASHER
Steel, spring, Zinc plated, Internal tooth
$\frac{.460}{.480} \times \frac{.250}{.270} \times \frac{.017}{.027}$
NUT
1018 Steel, Zinc plated
1/4-28NF-2B
$\frac{.425}{.437}$ across flats $\times \frac{.178}{.193}$ Thick
$\frac{.485}{.505}$ across points

11/16 STUD (MH 746)

Finish meets all environmental requirements of MIL-STD-19500.

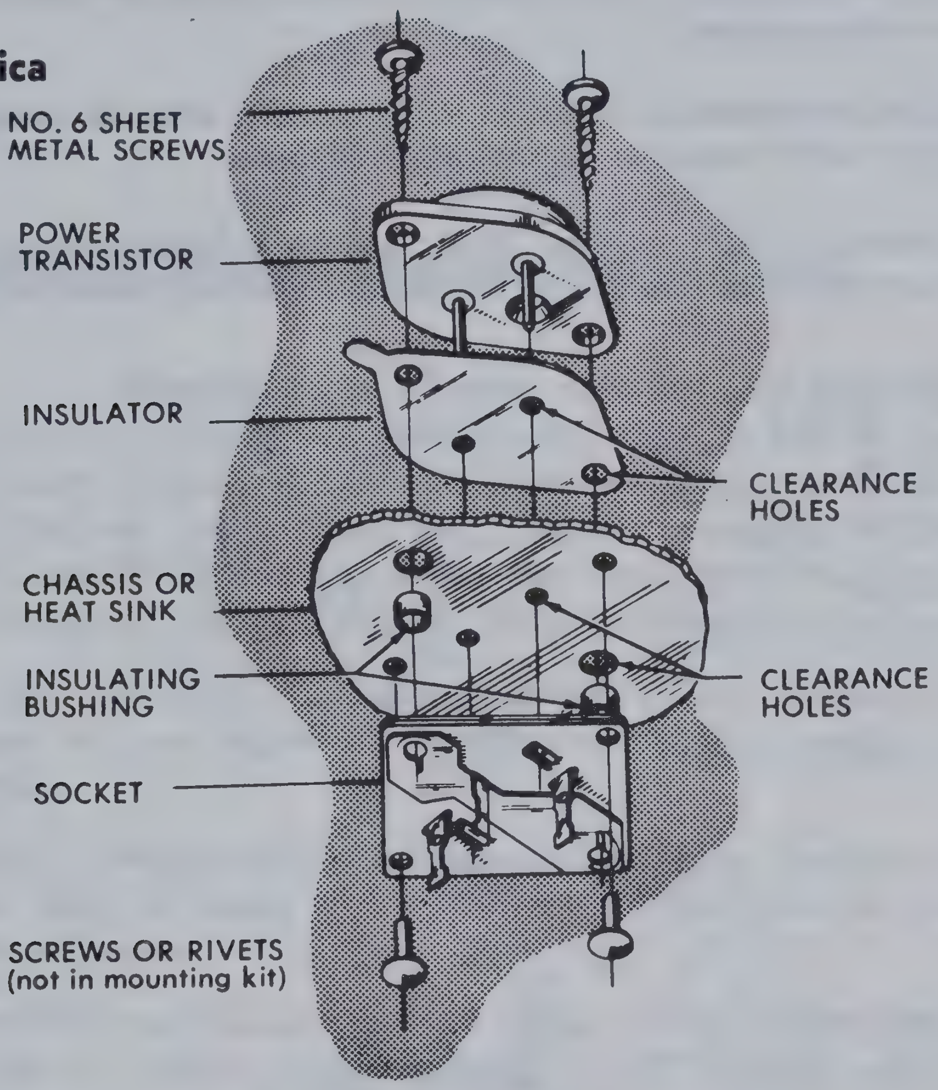
MH745 — 7/16"
STUD MOUNTING
HARDWARE

MH746 — 11/16"
STUD MOUNTING
HARDWARE


OUTSIDE DIA.
.469
.160
MAX.
HOLE DIA.
.265 ± .005
.437
MIN.
.075
.090
.625 MAX.
.028
.034

POWER TRANSISTOR MOUNTING KITS

MK-10 — teflon
MK-15 — mica
MK-20 — anodized aluminum
MK-25 — mica


NO. 6 SHEET METAL SCREWS
POWER TRANSISTOR
INSULATOR
CLEARANCE HOLES
CHASSIS OR HEAT SINK
INSULATING BUSHING
CLEARANCE HOLES
SOCKET
SCREWS OR RIVETS (not in mounting kit)

Typical thermal characteristics for teflon, mica, and anodized aluminum insulators used in mounting kits are given in the table below. (Figures may vary with mounting torque applied. Do not over stress.)

KIT TYPE	INSULATING WASHER	TYPICAL THERMAL RESISTANCE (°C/Watt)	
		Dry	With DC4*
—	No Insulator	.20	.10
MK-10	Teflon	1.45	.80
MK-15	Mica	.80	.40
MK-20	Anodized Aluminum	.40	.35
MK-25	Mica	.80	.40

*DC4 is Dow Corning No. 4 Silicone Lubricant.

Mounting kits, types MK-10, MK-15, MK-20, and MK-25 provide the necessary hardware for correctly mounting all TO-3 and TO-66 industry standard power transistor types to a chassis. With these kits, power transistors can be electrically insulated from the heat sink chassis, while maintaining complete heat transfer characteristics.

Included in these highly useful kits are a transistor mounting socket, front and back mounting templates for hole drilling guides, two #6 mounting screws, two insulating bushings, an insulating washer and complete mounting instructions.

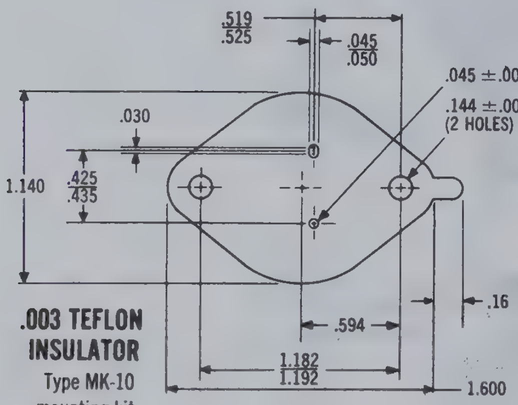
MK-10, MK-15, MK-20, MK-25 (continued)

The teflon-coated glass cloth insulating washer, included in kit MK-10, will find use in installations requiring an insulator of excellent durability. The mica insulator, in kit MK-15 and MK-25, is characterized by very high thermal conductivity. In applications where both good thermal conduction and durability are necessary, the anodized aluminum insulator supplied in kit MK-20, is recommended.

The transistor socket included in all mounting kits, is made of rugged laminated phenolic, with contacts of phosphor bronze.

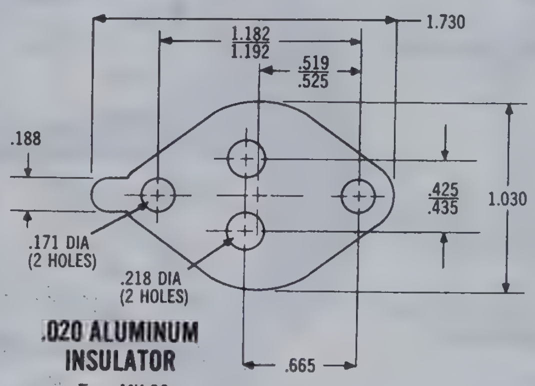
Three cadmium plated solder lugs, having a 15-amp maximum current capacity, are provided for base, emitter and collector connections.

TO-3



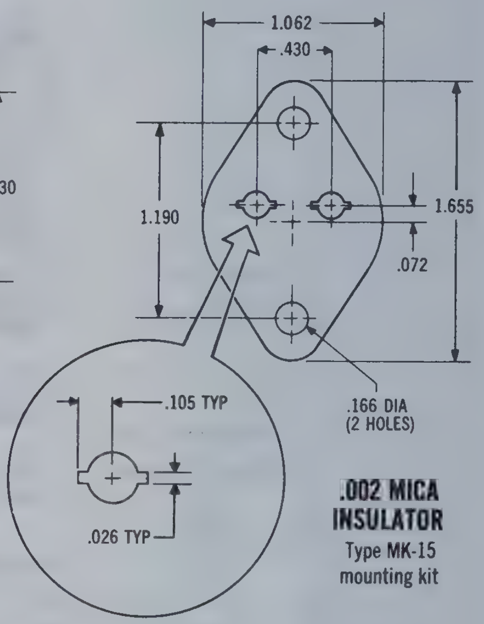
.519
.525
.045
.050
.045 ±.003 DIA
.144 ±.003 DIA
(2 HOLES)
.030
1.140
.425
.435
.594
.16
1.182
1.192
1.600

.003 TEFLON INSULATOR
Type MK-10 mounting kit



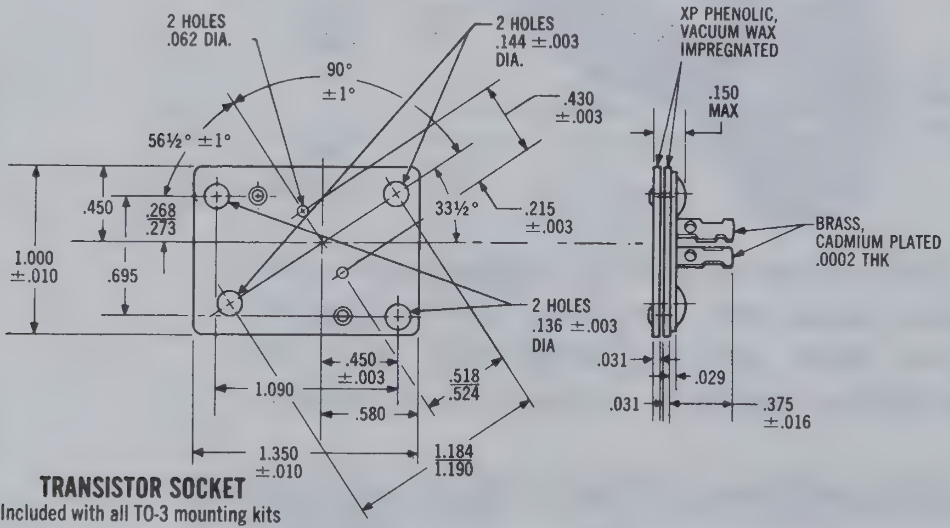
1.730
1.182
1.192
.519
.525
.188
.425
.435
1.030
.171 DIA
(2 HOLES)
.218 DIA
(2 HOLES)
.665

.020 ALUMINUM INSULATOR
Type MK-20 mounting kit



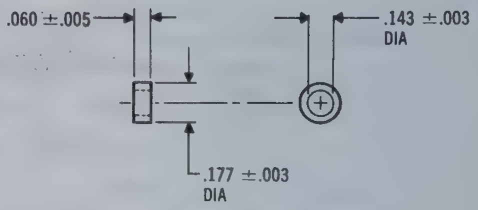
1.062
.430
1.190
1.655
.072
.105 TYP
.026 TYP
.166 DIA
(2 HOLES)

.002 MICA INSULATOR
Type MK-15 mounting kit



2 HOLES
.062 DIA.
90°
±1°
56½° ±1°
2 HOLES
.144 ±.003
DIA.
.430
±.003
33½°
.215
±.003
.450
.268
.273
1.000
±.010
.695
2 HOLES
.136 ±.003
DIA
.450
±.003
1.090
.580
.518
.524
1.350
±.010
1.184
1.190
XP PHENOLIC,
VACUUM WAX
IMPREGNATED
.150
MAX
BRASS,
CADMIUM PLATED
.0002 THK
.031
.029
.031
.375
±.016

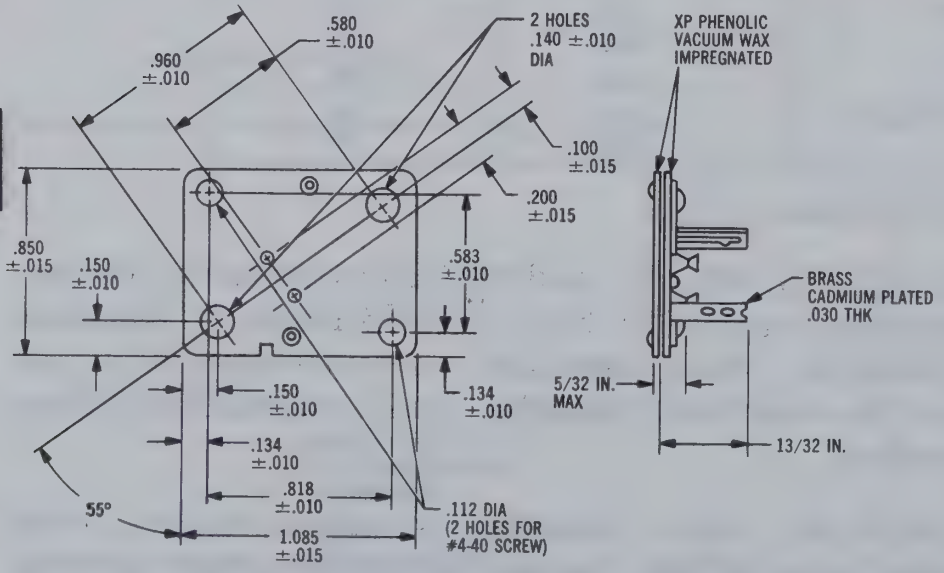
TRANSISTOR SOCKET
Included with all TO-3 mounting kits



.060 ±.005
.143 ±.003
DIA
.177 ±.003
DIA

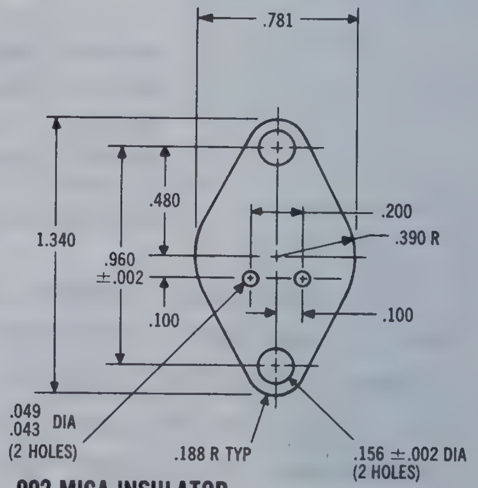
TEFLON INSULATING BUSHING
Included with all mounting kits

TO-66



.580
±.010
.960
±.010
2 HOLES
.140 ±.010
DIA
.100
±.015
.200
±.015
.583
±.010
.850
±.015
.150
±.010
.150
±.010
.134
±.010
.134
±.010
.818
±.010
55°
1.085
±.015
.112 DIA
(2 HOLES FOR
#4-40 SCREW)
XP PHENOLIC
VACUUM WAX
IMPREGNATED
BRASS
CADMIUM PLATED
.030 THK
5/32 IN.
MAX
13/32 IN.

TRANSISTOR SOCKET
Included with all TO-66 mounting kits



.781
1.340
.480
.960
±.002
.100
.200
.390 R
.100
.049
.043 DIA
(2 HOLES)
.188 R TYP
.156 ±.002 DIA
(2 HOLES)

.002 MICA INSULATOR
Type MK-25 mounting kit

TEFLON INSULATING BUSHING
Included with all mounting kits
(Same as for TO-3)

POWER TRANSISTOR MOUNTING KITS

Mounting kits, types MK-30 and MK-35, provide the necessary hardware to properly mount the TO-36 case (standard industry-type power transistors) to the chassis. With these kits, power transistors can be electrically insulated from the heat sink chassis, while maintaining complete heat transfer characteristics

MK-30 Designed for use in applications requiring 30 Amps or less with solder connection to the transistor leads.

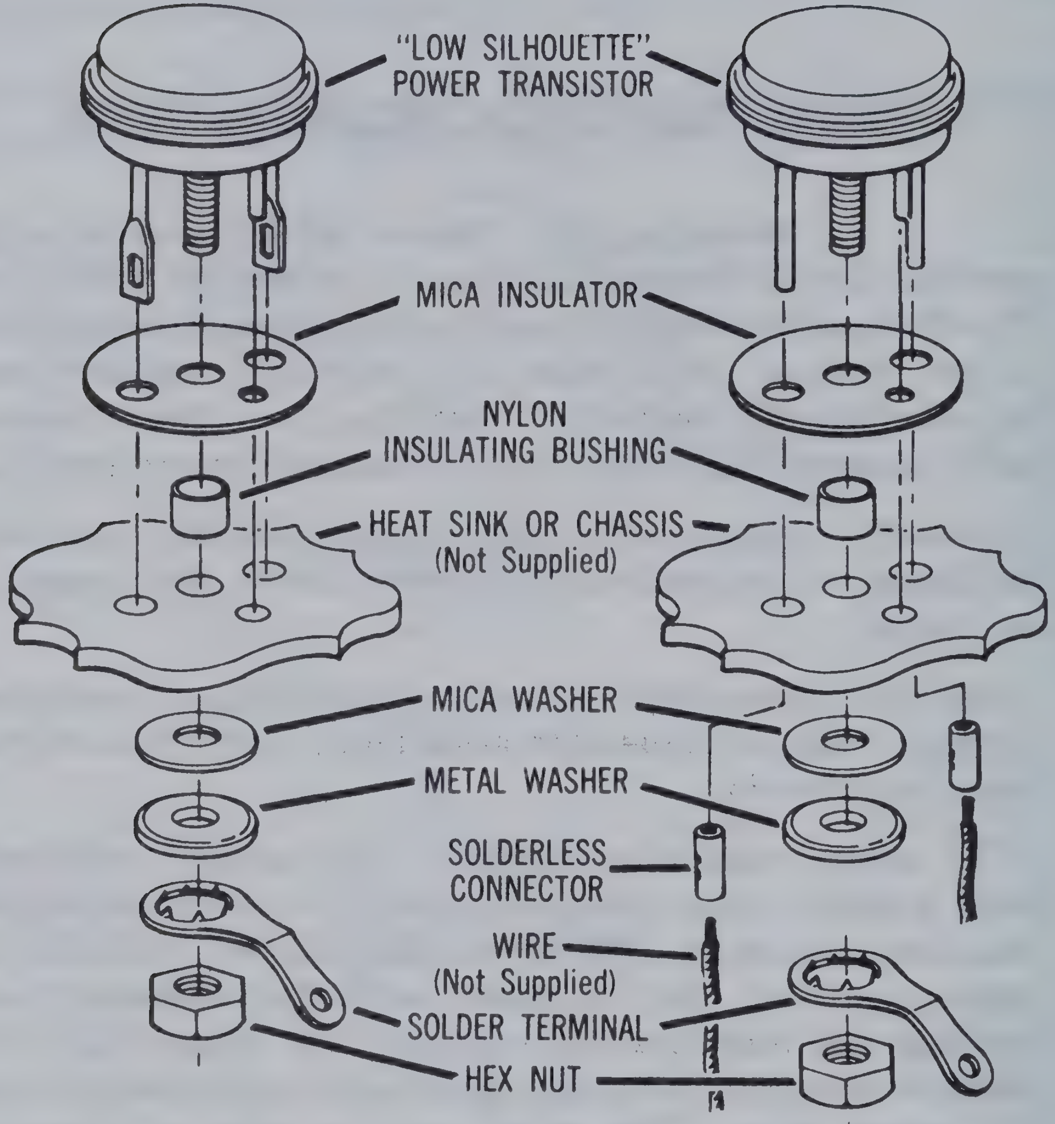
MK-35. Designed for use in applications requiring greater than 30 Amps with solderless connection to the transistor leads.

To obtain maximum contact area between case and heat sink for better heat transfer, it is recommended that the transistor first be mounted on the heat sink or chassis. Then, for maximum wire-to transistor lead strength and high-current capacity, the solderless connectors provided are crimped to the transistor leads and heavy wire. The wires may be soldered directly to the leads if strength and high currents (approximately 50 Amps) are not the primary considerations. (Solderless connector tools are available from the Thomas and Betts Co., Elizabeth, N. J. Possible wire types: AWG #12 regular strand (65 x 30) or #10 solid-tinned copper wire.)

These new mounting kits are individually packaged in a convenient polyethylene container.

MK-30
15 AND 30
AMP UNITS

MK-35
60 AMP UNITS


"LOW SILHOUETTE"
POWER TRANSISTOR
MICA INSULATOR
NYLON
INSULATING BUSHING
HEAT SINK OR CHASSIS
(Not Supplied)
MICA WASHER
METAL WASHER
SOLDERLESS
CONNECTOR
WIRE
(Not Supplied)
SOLDER TERMINAL
HEX NUT

NOTE: The surface to which the transistor is mounted must be smooth, flat and free of burrs or irregularities which may damage insulation or prevent intimate contact with the transistor mounting base.

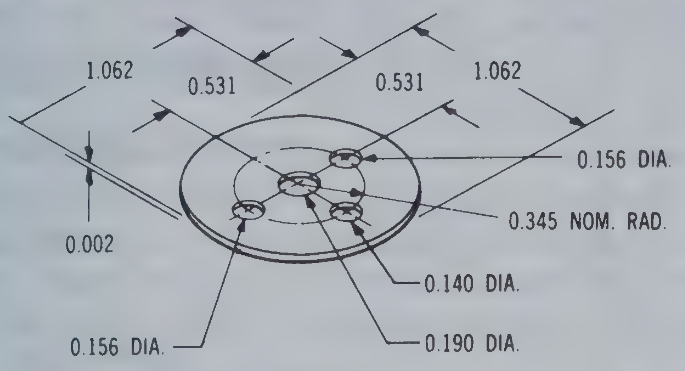
Typical thermal characteristics for mica insulators are given in the table below. (Figures may vary with mounting torque applied. Do not over stress.)

KIT TYPE	INSULATING WASHER	MAXIMUM THERMAL RESISTANCE (°C/Watt)	
		Dry	With DC4*
—	No Insulator	.20	.10
MK-30	Mica	.80	.40
MK-35	Mica	.80	.40

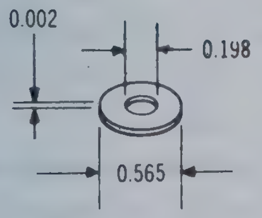
*DC4 is Dow Corning No. 4 Silicone Lubricant.

OUTLINE DIMENSIONS

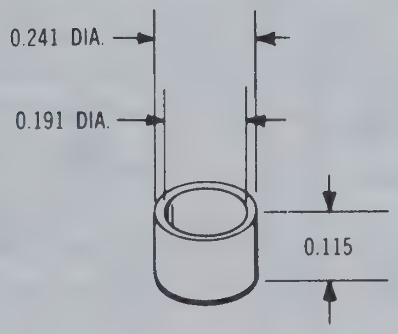
MK-30 / MK-35


1.062
0.531
0.531
1.062
0.156 DIA.
0.345 NOM. RAD.
0.002
0.140 DIA.
0.156 DIA.
0.190 DIA.

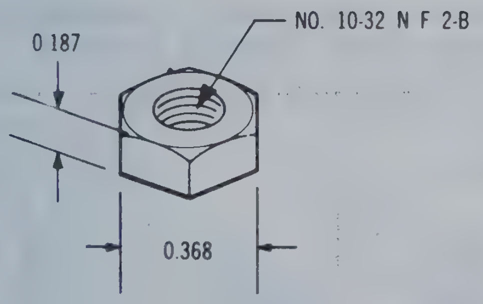
MICA INSULATOR
14B52600F06


0.002
0.198
0.565

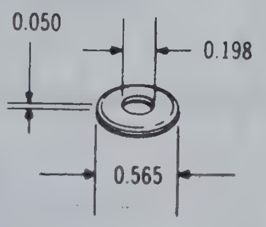
MICA WASHER
14B52600F01


0.241 DIA.
0.191 DIA.
0.115

NYLON INSULATING BUSHING
43B51547F01


NO. 10-32 N F 2-B
0 187
0.368

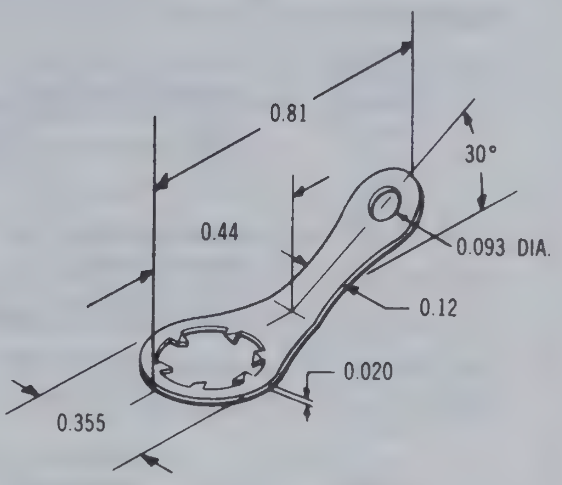
HEX NUT
(Cadmium Plated)
02B51568F13


0.050
0.198
0.565

METAL WASHER
(Cadmium Plated)
04B51567F17

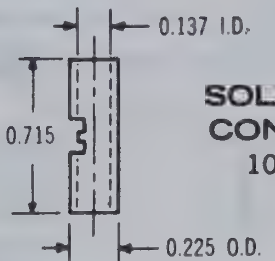
NOTE: All Dimensions Nominal

MK-30 ONLY

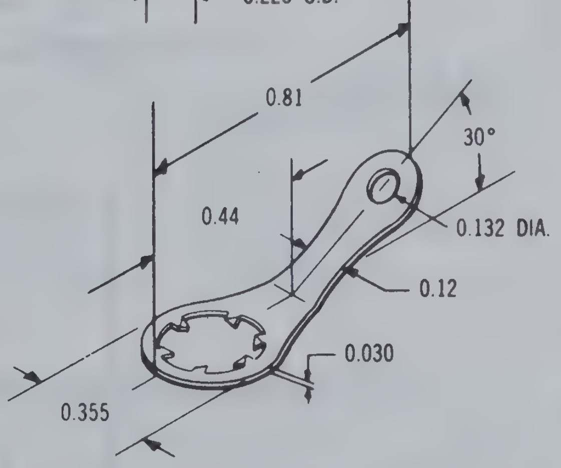

0.81
30°
0.44
0.093 DIA.
0.12
0.020
0.355

SOLDER TERMINAL
(Tin Dipped)
29B52595F13

MK-35 ONLY


0.137 I.D.
0.715
0.225 O.D.

SOLDERLESS CONNECTOR
10M52014A

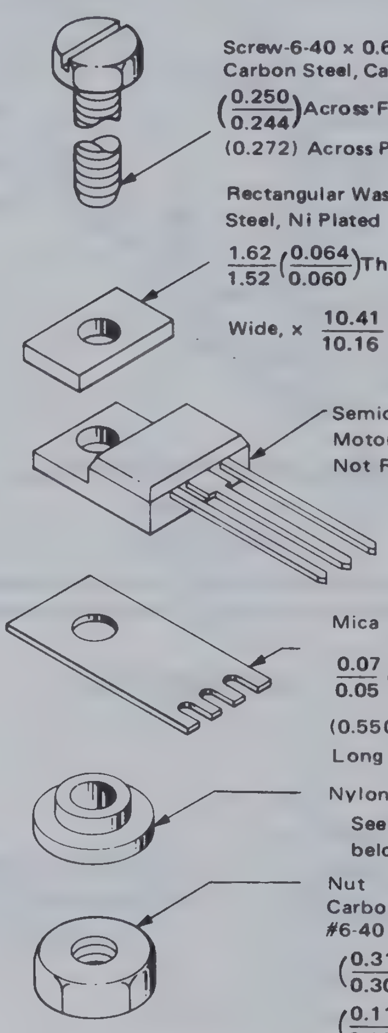

0.81
30°
0.44
0.132 DIA.
0.12
0.030
0.355

SOLDER TERMINAL
(Cadmium Plated)
29B52595F09

MOUNTING HARDWARE for MOTOROLA Case 221

DIMENSIONS – MILLIMETER (INCH)

MK221-1



Screw-6-40 x 0.62 Long
Carbon Steel, Cadmium Plated
$\left(\frac{0.250}{0.244}\right)$ Across Flats x $\left(\frac{0.093}{0.080}\right)$ Thick
(0.272) Across Points

Rectangular Washer
Steel, Ni Plated
$\frac{1.62}{1.52}\left(\frac{0.064}{0.060}\right)$ Thick x $\frac{5.72}{5.46}\left(\frac{0.225}{0.215}\right)$
Wide, x $\frac{10.41}{10.16}$ $\frac{0.410}{0.400}$ Long

Semiconductor
Motorola Case No. 221
Not Furnished With Kit

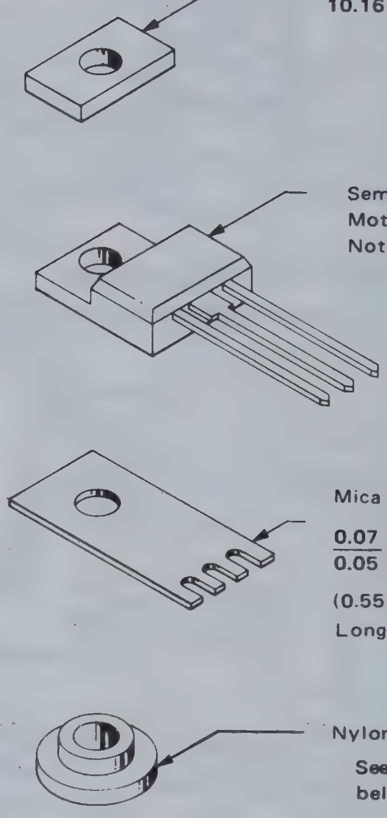
Mica Insulator
$\frac{0.07}{0.05}\left(\frac{0.003}{0.002}\right)$ Thick x 13.97
(0.550) Wide x 21.3 (0.84)
Long

Nylon Bushing
See detail
below.

Nut
Carbon Steel, Cadium Plated
#6-40 Thread
$\left(\frac{0.312}{0.302}\right)$ Across Flats X
$\left(\frac{0.114}{0.102}\right)$ Thick
$\left(\frac{0.361}{0.344}\right)$ Across Points

MTG KIT MK221-1
(20CSB09456A001)

MK221-2



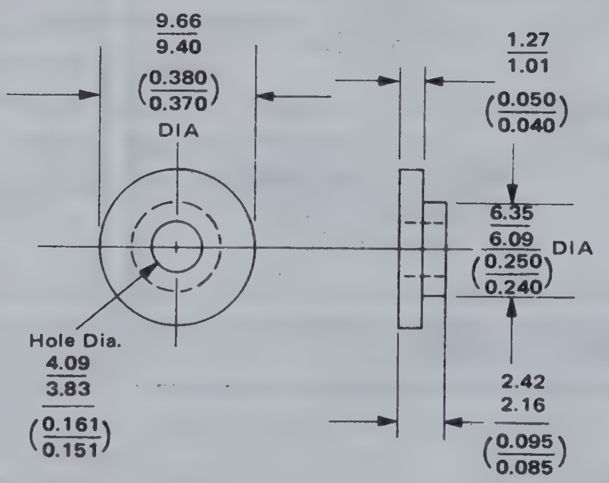
Rectangular Washer
Steel, Ni Plated
$\frac{1.62}{1.52}\left(\frac{0.064}{0.060}\right)$ Thick x $\frac{5.72}{5.46}\left(\frac{0.225}{0.215}\right)$
Wide, x $\frac{10.41}{10.16}\left(\frac{0.410}{0.400}\right)$ Long

Semiconductor
Motorola Case No. 221
Not Furnished With Kit

Mica Insulator
$\frac{0.07}{0.05}\left(\frac{0.003}{0.002}\right)$ Thick x 13.97
(0.550) Wide x 21.3 (0.84)
Long

Nylon Bushing
See detail
below.

MTG KIT MK221-2
(20CSB09456A002)


9.66/9.40 (0.380/0.370) DIA
1.27/1.01 (0.050/0.040)
6.35/6.09 (0.250/0.240) DIA
Hole Dia. 4.09/3.83 (0.161/0.151)
2.42/2.16 (0.095/0.085)

MS-10 POWER TRANSISTOR HEAT SINK

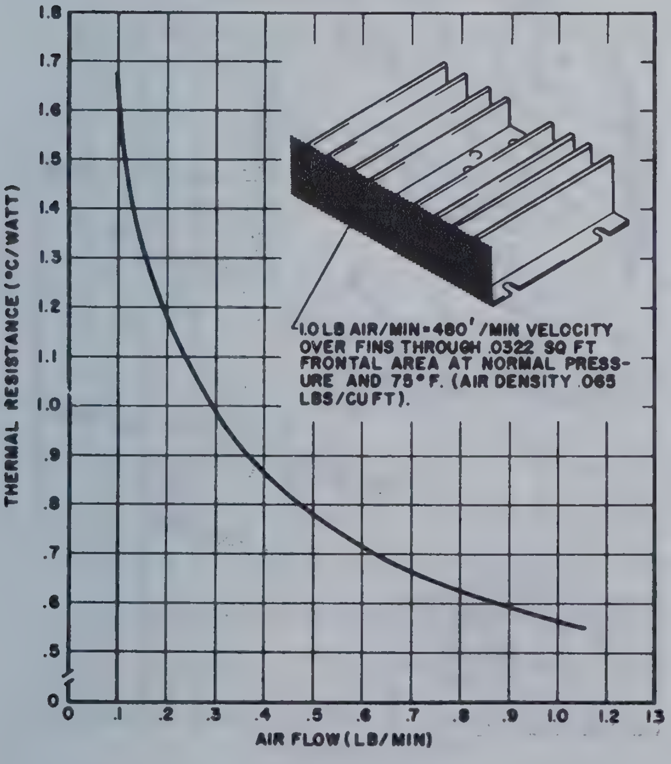
Designed specifically for use with the industry standard type TO-3 (diamond) power transistor, this heat sink will reduce transistor junction temperatures and permit safe operation at higher power levels or under high ambient temperatures.

Cooling is accomplished with the MS-10 by conduction, convection and radiation. Although measuring only 4-1/2" by 3-1/16", the MS-10 makes possible thermal dissipation effectively equal to that of a flat sheet of aluminum 10" by 8" by 1/8". This greatly reduces the chassis area necessary for heat dissipation at higher power levels.

The transistor with use of silicon grease should be mounted directly to the MS-10 heat sink with the insulating washers placed at each of the (4) mounting points located on the heat sink flange. This is accomplished by placing (1) shoulder washer on the bottom and (1) flat washer on top of each mounting point of the heat sink. A mica washer is supplied to isolate the transistor from the heat sink if desired.

The MS-10 has a hole pattern arrangement which will accommodate the mounting of one TO-3 power transistor and/or two 10/32" stud mounting diodes. Provided with each MS-10 package is an MK-15 power transistor mounting kit which contains a power transistor socket, mounting screws, complete mounting instructions and a mica insulating washer for use in mounting transistors to the heat sink.

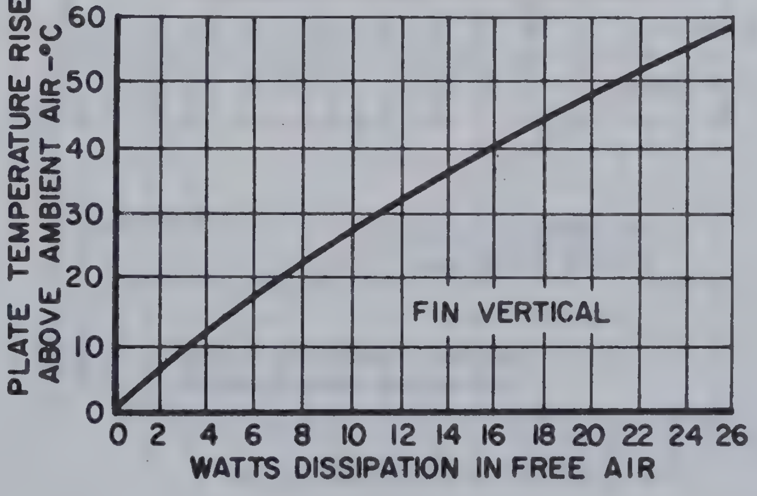
This heat sink is easy to install and does not interfere with the operation of the transistor. For optimum efficiency, the MS-10 should be mounted with the fins vertical.



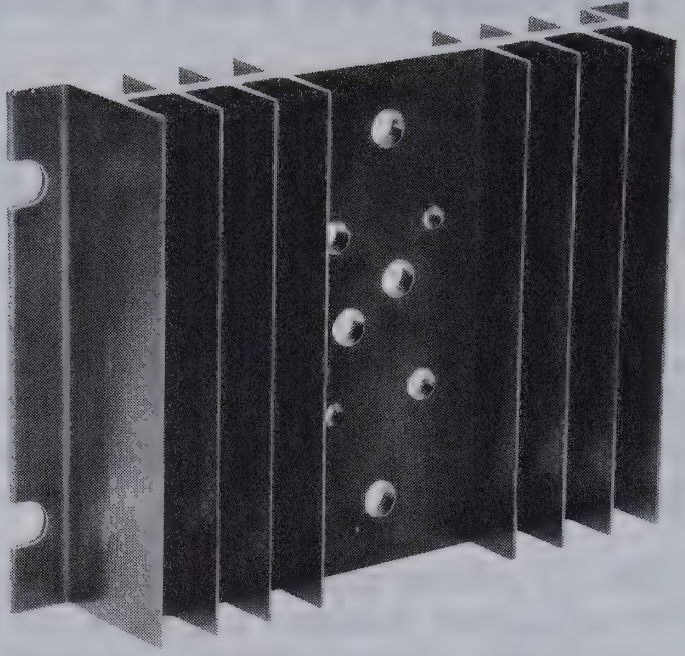
PERFORMANCE UNDER FORCED AIR FLOW OF MS-10 NATURAL CONVECTION TRANSISTOR HEAT SINK

SPECIFICATIONS

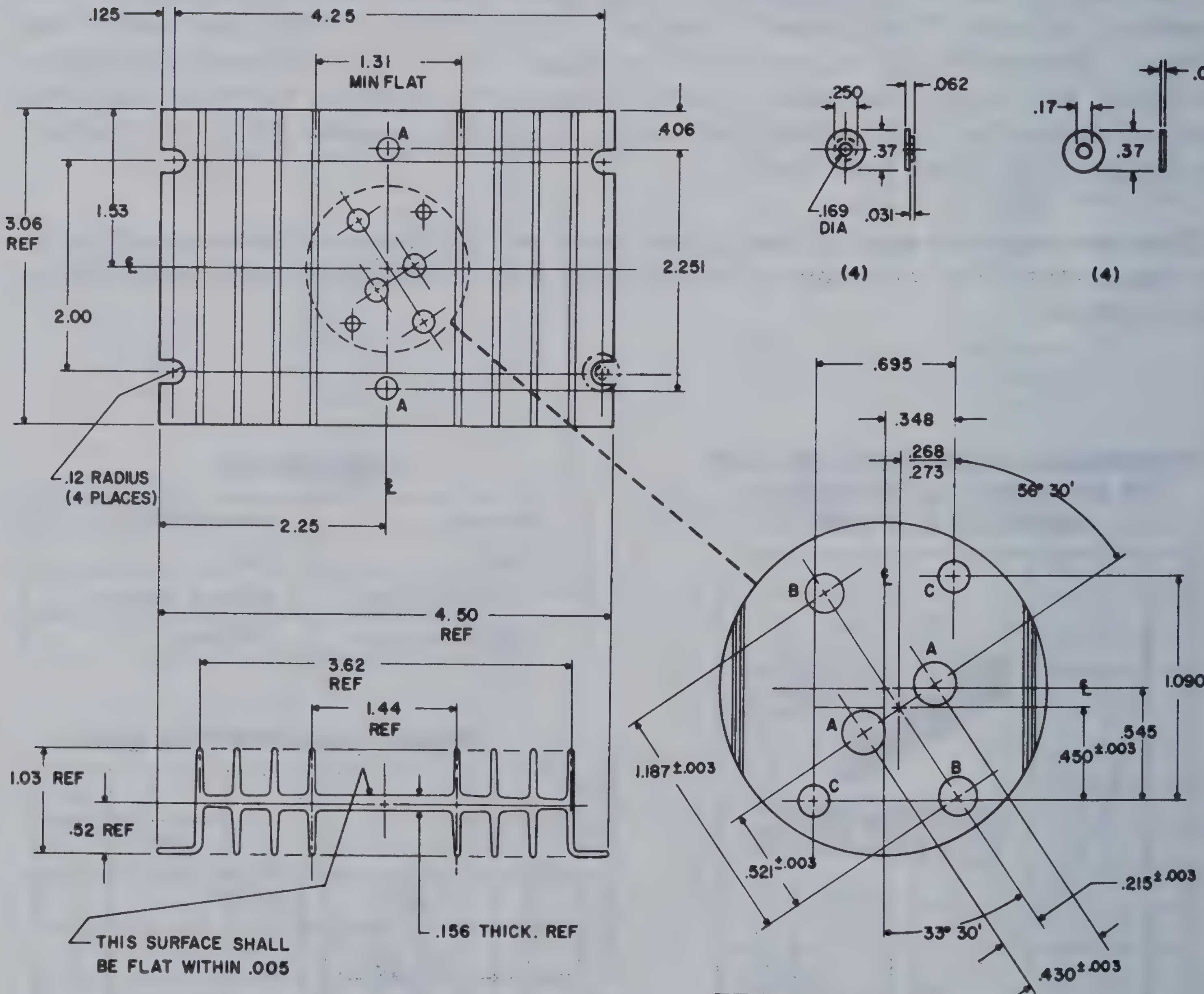
Material	Aluminum Alloy
Finish	Black
Total Surface Area	65 Sq. In. (approx.)
Thermal Resistance	3°C/watt



THERMAL CHARACTERISTICS MS-10



Providing cooling by conduction, convection and radiation, the MS-10 Heat Sink, measuring only 4-1/2" by 3-1/16", has thermal dissipation equal to that of a flat sheet of aluminum 10" x 8" x 1/8".


.125
4.25
1.31
MIN FLAT
.406
A
3.06
REF
1.53
2.00
2.251
A
.12 RADIUS
(4 PLACES)
2.25
.250
.062
.37
.169
DIA
.031
(4)
.17
.03
.37
(4)
.695
.348
.268
.273
56° 30'
B
C
A
1.090
A
.545
.450±.003
B
C
1.187±.003
.521±.003
.215±.003
33° 30'
.430±.003
4.50
REF
3.62
REF
1.44
REF
1.03 REF
.52 REF
THIS SURFACE SHALL
BE FLAT WITHIN .005
.156 THICK. REF

HOLE LIST	
HOLE	SIZE
A	.218 DIA
B	.188 DIA
C	.140 DIA

NATURAL CONVECTION COOLER IS ALUMINUM. FINISH IS BLACK.

MS-15 POWER TRANSISTOR HEAT SINK

Designed specifically for use with the industry standard type TO-36 ("doorknob") power transistor, this heat sink will reduce transistor junction temperatures and permit safe operation at higher power levels or under high ambient temperatures.

Cooling is accomplished with the MS-15 by conduction, convection and radiation. Although measuring only 4-1/2" by 3-1/16", the MS-15 makes possible thermal dissipation effectively equal to that of a flat sheet of aluminum 10" by 8" by 1/8". This greatly reduces the chassis area necessary for heat dissipation at higher power levels.

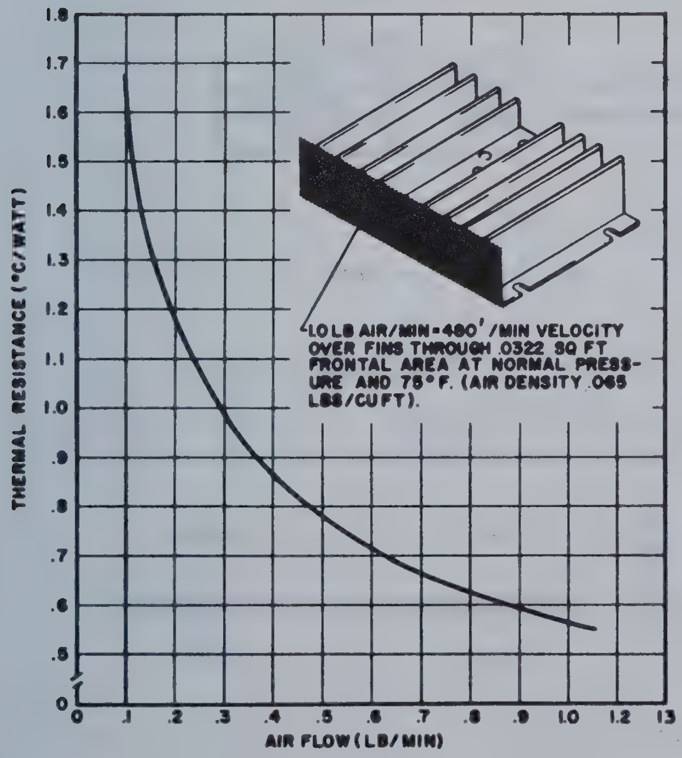
The MS-15 has a hole pattern arrangement which will accommodate the mounting of one TO-36 power transistor. Provided with each MS-15 package is assorted mounting hardware such as: insulating bushing, mica washer, nut, flat washer, solder terminal and insulating washers used in mounting the heat sink to the chassis.

The transistor with use of silicon grease should be mounted directly to the MS-15 heat sink with the insulating washers placed at each of the (4) mounting points located on the heat sink flange. This is accomplished by placing (1) shoulder washer on the bottom and (1) flat washer on top of each mounting point of the heat sink. A mica washer is supplied to isolate the transistor from the heat sink if desired.

> NOTE: When mounting the transistor to the heat sink a torque of 20 in. lbs. max should be applied to the stud.

This heat sink is easy to install and does not interfere with the operation of the transistor. For optimum efficiency, the MS-15 should be mounted with the fins vertical.

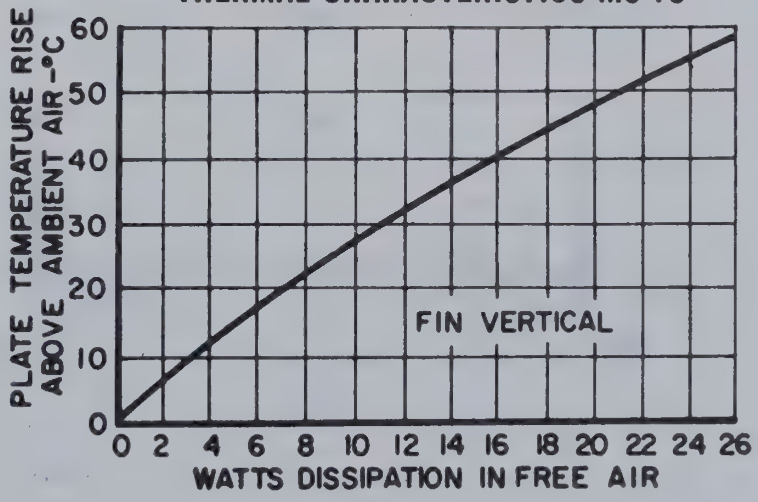
PERFORMANCE UNDER FORCED AIR FLOW OF MS-15 NATURAL CONVECTION TRANSISTOR HEAT SINK



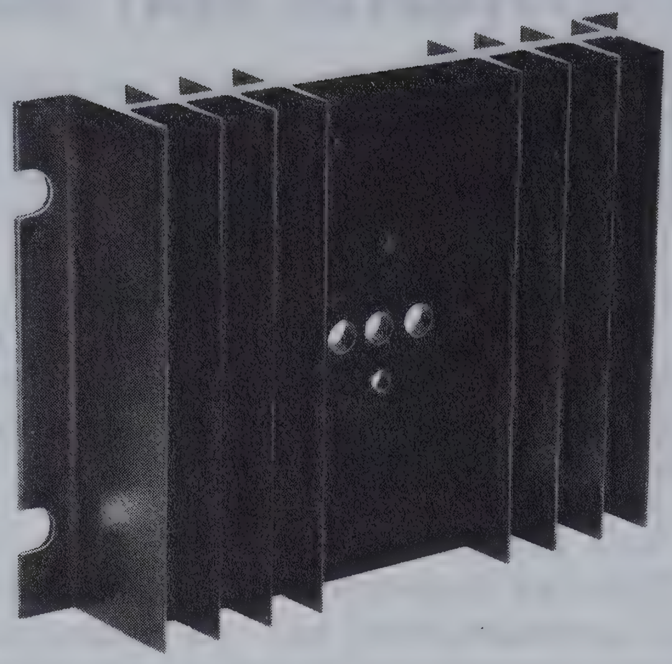
SPECIFICATIONS

Material	Aluminum Alloy
Finish	Black
Total Surface Area	65 Sq. In. (approx.)
Thermal Resistance	3°C/watt

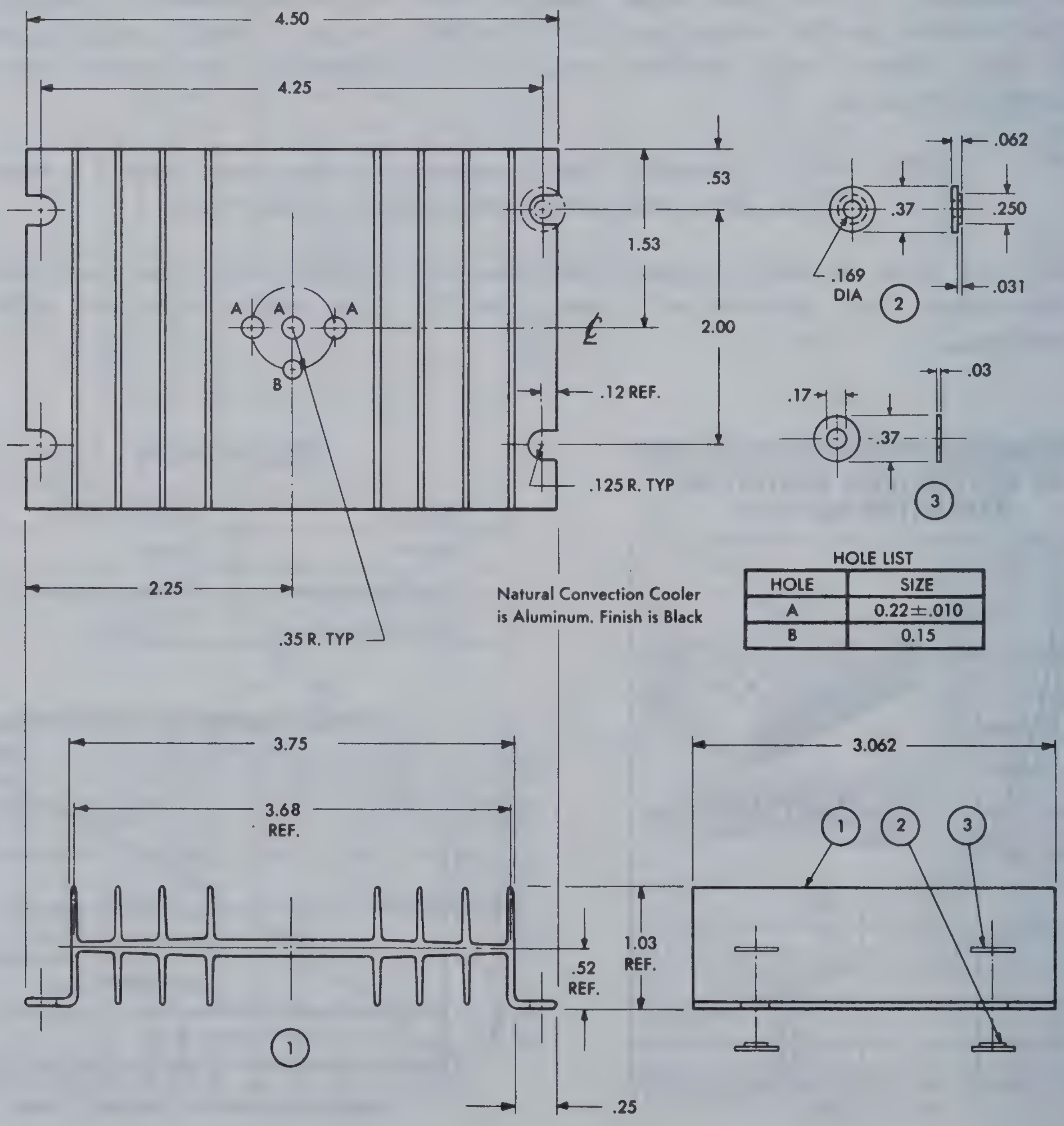
THERMAL CHARACTERISTICS MS-15



MS-15 (continued)



Providing cooling by conduction, convection and radiation, the MS-15 Heat Sink, measuring only 4-1/2" by 3-1/16", has thermal dissipation equal to that of a flat sheet of aluminum 10" x 8" x 1/8".


4.50
4.25
.53
1.53
2.00
.062
.37
.250
.169
DIA
②
.031
A
A
A
B
℄
.12 REF.
.03
.17
.37
③
.125 R. TYP
2.25
.35 R. TYP
3.75
3.68
REF.
1.03
REF.
.52
REF.
①
.25
3.062
①
②
③

Natural Convection Cooler is Aluminum. Finish is Black

HOLE LIST

HOLE	SIZE
A	0.22±.010
B	0.15

OUTLINE DIMENSIONS

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Registered Case Number Cross Reference Page 9-4
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Leadforms Page 9-39

MOTOROLA CASE NUMBER CROSS REFERENCE

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Case 11-03	–
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Case 17	–
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Case 21-02	TO-17
Case 22-01	–
Case 22-03	TO-18
Case 22A	–
Case 23	TO-107
Case 24	TO-102
Case 26	TO-46
Case 27	TO-52
Case 28-01	–
Case 29-01	–
Case 29-02	TO-92
Case 29-03	–
Case 31-01	–
Case 31-03	–
Case 31A-01	–
Case 34A	TO-12
Case 36	TO-60
Case 39	TO-37
Case 41	–
Case 42A	DO-5
Case 43-02	DO-21
Case 43-04	–
Case 44-01	DO-4
Case 44-02	–
Case 45	–
Case 46	–
Case 47	–
Case 47A	–
Case 48	–
Case 51	DO-7
Case 52	DO-13
Case 53	–
Case 54-03	–
Case 55	–
Case 56-02	DO-4
Case 57	–
Case 58	–
Case 59-01	DO-41
Case 59-02	–
Case 60	–
Case 61	–
Case 63-02	–
Case 64-02	TO-48
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Case 77-02	–
Case 77-03	–
Case 79-01	–
Case 79-02	TO-39
Case 80-02	TO-66
Case 81A-03	–
Case 81A-04	–
Case 82-01	–
Case 82-02	–
Case 85	–
Case 85L-02	–
Case 86	–
Case 86L-02	–
Case 87-02	–
Case 87L	–
Case 88	–
Case 88L	–
Case 90-04	–
Case 90-05	–
Case 100	–
Case 105	–
Case 106	–
Case 107	–
Case 108	–
Case 109	–
Case 110	–
Case 111	–
Case 112	–
Case 113	–
Case 114	–
Case 115	–
Case 116-02	–
Case 117	–
Case 119-01	–
Case 126	–
Case 127	–
Case 128	–
Case 130	–
Case 131	–
Case 132	–
Case 133	–
Case 134	–
Case 135	–
Case 136	–
Case 137	–
Case 138	–
Case 139	–
Case 144B-03	–
Case 144C-02	–
Case 144D-04	–
Case 145A-01	–
Case 145A-02	–
Case 145C-01	–
Case 146	DO-14
Case 149-02	TO-1
Case 152-02	–
Case 154	–
Case 154A	–
Case 155	–
Case 155A	–
Case 156	–
Case 156A	–
Case 157	–
Case 157A-01	–
Case 158	–
Case 159-02	–
Case 160-03	TO-59
Case 160A	TO-59
Case 161	–
Case 166-02	–
Case 167	–

MOTOROLA CASE NUMBER CROSS REFERENCE (continued)

Case 168	–
Case 171	–
Case 173	–
Case 174-02	TO-203AA
Case 175	–
Case 176	–
Case 177	TO-114
Case 178	–
Case 179-01	–
Case 179-02	–
Case 180-01	–
Case 181-02	–
Case 182-02	–
Case 182-03	–
Case 183	–
Case 184	–
Case 188	TO-63
Case 189	–
Case 190-01	–
Case 194	–
Case 197	–
Case 198	–
Case 199-03	–
Case 199-04	–
Case 205	–
Case 206A	–
Case 207A-01	–
Case 208	–
Case 209	–
Case 210	–
Case 211-01	–
Case 211-02	–
Case 212	–
Case 215	–
Case 216	–
Case 219	TO-94
Case 220-01	–
Case 220-02	–
Case 221-02	TO-220AB
Case 226	–
Case 234-01	–
Case 234-02	–
Case 235	–
Case 237-01	–
Case 238-01	–
Case 239-01	–
Case 244	–
Case 245	–
Case 246	TO-83
Case 247	–
Case 249-01	–
Case 250	–
Case 253	–
Case 257	DO-5
Case 259-01	–
Case 262	–
Case 263-02	–
Case 264	–
Case 267	–
Case 270-01	–
Case 271-02	–
Case 278-02	–
Case 279-01	–
Case 280-01	–
Case 281-01	–
Case 282-01	–
Case 287-01	–
Case 289-01	–
Case 290-01	–
Case 291-01	–
Case 292-01	–
Case 601	TO-99
Case 602A-03	–
Case 602B	–
Case 602C-03	–
Case 603-02	TO-100
Case 603-03	–
Case 606-04	TO-91
Case 607-04	–
Case 607-05	–
Case 608	TO-90
Case 609	TO-85
Case 610A-03	TO-89
Case 614-02	–
Case 617-04	–
Case 619-02	–
Case 620	–
Case 621	–
Case 623	–
Case 626	–
Case 627	–
Case 631	–
Case 632	TO-116
Case 641A	–
Case 642-01	TO-76
Case 643A-01	–
Case 644A-02	–
Case 645-02	–
Case 646-02	–
Case 647	–
Case 648	–
Case 649	–
Case 650	–
Case 651	–
Case 652-02	–
Case 654-04	TO-78
Case 654-07	–
Case 655-01	TO-71
Case 655-02	–
Case 662-01	–
Case 663	–
Case 664-01	–
Case 665	–
Case 667-03	–
Case 673-03	–
Case 675	–
Case 676	–
Case 677	–
Case 680-03	–
Case 683-01	–
Case 684	–
Case 685	–
Case 686	–
Case 687-02	–
Case 688-02	–
Case 694-02	–
Case 695	–
Case 697	–
Case 700-01	–
Case 702	–

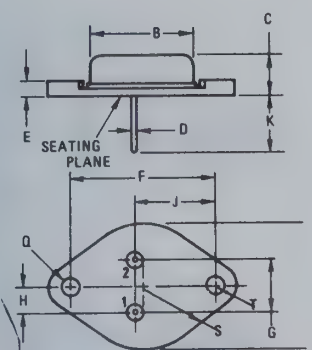
REGISTERED CASE NUMBER CROSS REFERENCE

DO-4	Case 44
	Case 56-02
DO-5	Case 42A
	Case 257
DO-7	Case 51
DO-13	Case 52-03
DO-14	Case 146
DO-21	Case 43-02
DO-31	Case 81-02
DO-41	Case 59-01
TO-1	Case 149-02
TO-3	Case 1-30
TO-5	Case 31-01
	Case 31-03
TO-9	Case 143
TO-12	Case 34A
TO-17	Case 21-02
TO-18	Case 22-03
TO-36	Case 5-03
TO-37	Case 39
TO-39	Case 79-02
TO-41	Case 161
TO-46	Case 26-03
TO-48	Case 64-02
TO-52	Case 27
TO-59	Case 160-03
	Case 160A-03
TO-60	Case 36
TO-61	Case 9
TO-63	Case 188
TO-66	Case 80-02
TO-68	Case 7-02
TO-71	Case 655
TO-72	Case 20-03
TO-76	Case 642
TO-78	Case 654-04
TO-83	Case 246
TO-85	Case 600
TO-90	Case 608
TO-91	Case 606-04
TO-92	Case 29-02
TO-94	Case 219
TO-100	Case 603-02
TO-102	Case 24
TO-107	Case 23
TO-114	Case 177
TO-116	Case 632
TO-203AA	Case 174-02
TO-220AB	Case 221-02

CASE OUTLINE DIMENSIONS

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

CASE 1 TO-3

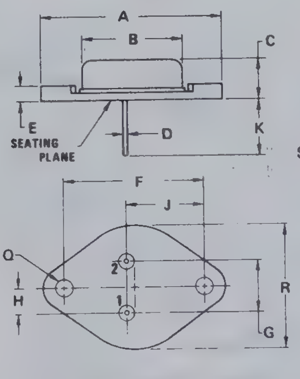

B
C
E
SEATING PLANE
D
K
F
J
Q
2
1
H
T
S
G

STYLE 1:
PIN 1. BASE
2. EMITTER
CASE-COLLECTOR
STYLE 2:
PIN 1. BASE
2. COLLECTOR
CASE-EMITTER

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
B	–	22.23	–	0.875
C	6.35	11.43	0.250	0.450
D	0.97	1.09	0.038	0.043
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.21	5.72	0.205	0.225
J	16.64	17.15	0.655	0.675
K	7.92	–	0.312	–
Q	3.84	4.09	0.151	0.161
S	–	13.34	–	0.525
T	–	4.78	–	0.188

All JEDEC dimensions and notes apply

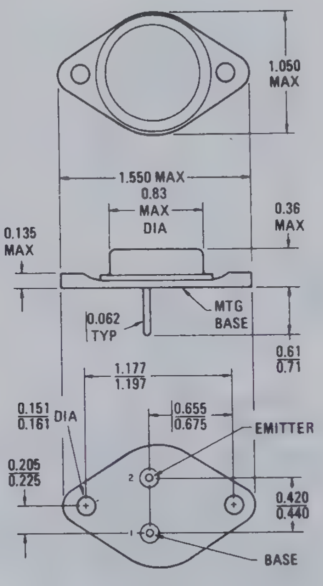
CASE 3-01


A
B
C
E
SEATING PLANE
D
K
F
J
Q
2
1
H
R
G

STYLE 1:
PIN 1. BASE
2. EMITTER
CASE - COLLECTOR

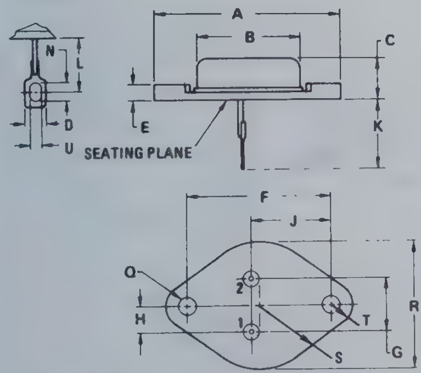
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	38.86	39.37	1.530	1.550
B	20.57	21.08	0.810	0.830
C	–	9.14	–	0.360
D	1.22	1.32	0.048	0.052
E	3.18	3.43	0.125	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	8.13	10.67	0.320	0.420
Q	3.84	4.09	0.151	0.161
R	26.16	26.67	1.030	1.050

CASE 3-04


1.050 MAX
1.550 MAX
0.83 MAX DIA
0.36 MAX
0.135 MAX
0.062 TYP
MTG BASE
0.61
0.71
1.177
1.197
0.151
0.161 DIA
0.655
0.675
EMITTER
0.205
0.225
2
1
0.420
0.440
BASE

Collector connected to case

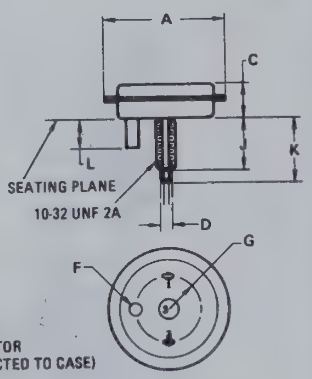
CASE 4-04


N
L
D
U
A
B
C
E
K
SEATING PLANE
F
J
Q
2
1
H
T
R
S
G

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	39.37	–	1.550
B	–	21.08	–	0.830
C	–	7.62	–	0.300
D	4.32	4.83	0.170	0.190
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	–	17.27	–	0.680
N	3.30	4.32	0.130	0.170
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050
U	2.03	3.05	0.080	0.120

STYLE 1:
PIN 1. BASE
2. EMITTER
CASE - COLLECTOR

CASE 5-03 TO-36

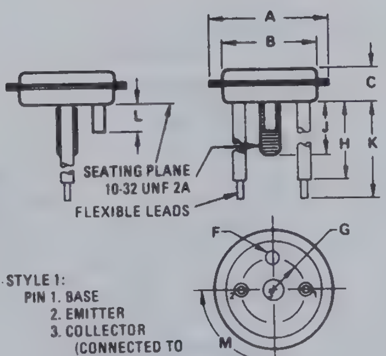

A
C
K
J
L
SEATING PLANE
10-32 UNF 2A
D
F
G

STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
(CONNECTED TO CASE)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	31.75	–	1.250
C	–	13.21	–	0.520
D	–	4.83	–	0.190
F	–	3.56	–	0.140
G	8.76 NOM		0.345 NOM	
J	9.53	12.70	0.375	0.500
K	15.49	18.03	0.610	0.710
L	–	7.92	–	0.312

All JEDEC dimensions and notes apply

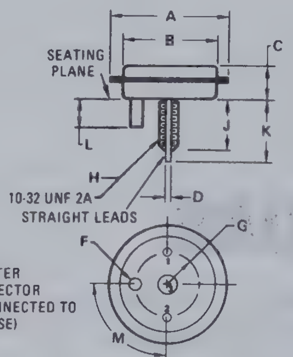
CASE 6


A
B
C
L
J
H
K
SEATING PLANE
10-32 UNF 2A
FLEXIBLE LEADS
F
G
2
M

STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
(CONNECTED TO CASE)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	33.35	–	1.313
B	–	25.53	–	1.005
C	–	15.88	–	0.625
F	–	3.58	–	0.141
G	8.76 BSC		0.345 BSC	
H	28.58	34.93	1.125	1.375
J	9.53	12.70	0.375	0.500
K	38.10	–	1.500	–
L	2.54	7.92	0.100	0.312
M	90° BSC		90° BSC	

CASE 7-02 TO-68

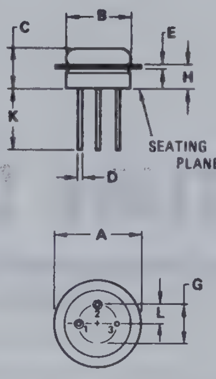


STYLE 1:
PIN1. BASE
2. EMITTER
3. COLLECTOR
(CONNECTED TO
CASE)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	31.75	–	1.250
B	25.15	–	0.990	–
C	6.99	12.70	0.275	0.500
D	1.02	2.41	0.040	0.095
F	2.29	3.56	0.090	0.140
G	8.51	9.02	0.335	0.355
H	4.212	4.310	0.1658	0.1697
J	9.52	12.70	0 375	0.500
K	15.49	18.03	0.610	0.710
L	2.54	7.92	0.100	0.312
M	85°	90°	85°	95°

All JEDEC dimensions and notes apply.

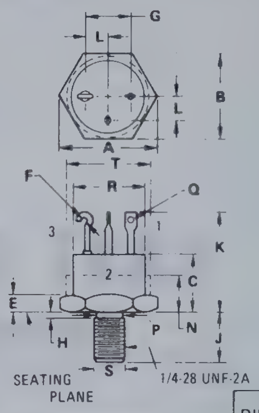
CASE 8



STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.86	16.51	0.585	0.650
B	12.32	12.57	0.485	0.495
C	6.10	7.62	0.240	0.300
D	0.69	0.84	0.027	0.033
E	0.51	1.02	0.020	0.040
G	7.16 BSC		0.282 BSC	
H	4.19	4.70	0.165	0.185
K	9.14	11.18	0.360	0.440
L	3.58 BSC		0.141 BSC	

CASE 9 TO-61



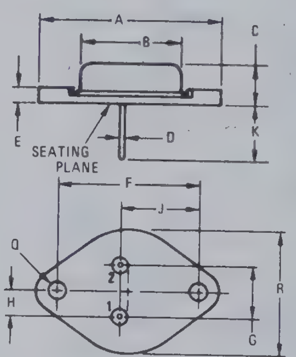
STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

All JEDEC dimensions and notes apply

Collector connected to case

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	19.30	20.07	0.760	0.790
B	16.94	17.45	0.667	0.687
C	8.26	11.68	0.325	0.460
E	2.29	3.81	0.090	0.150
F	1.17	1.96	0.046	0.077
G	8.64	10.54	0.340	0.415
H	–	2.29	–	0.090
J	10.72	11.56	0.422	0.455
K	16.26	22.23	0.640	0.875
L	4.32	5.41	0.170	0.213
N	–	6.86	–	0.270
P	5.59	6.32	0.220	0.249
Q	1.19	1.83	0.047	0.072
R	14.48	15.49	0.570	0.610
S	5.651	5.761	0.2225	0.2268
T	15.49	17.45	0.610	0.687

CASE 11-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	39.37	–	1.550
B	–	21.08	–	0.830
C	6.35	7.62	0.250	0.300
D	0.99	1.09	0.039	0.043
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	11 18	12.19	0.440	0.480
Q	3.84	4.09	0.151	0.161
R	·	26.67	–	1.050

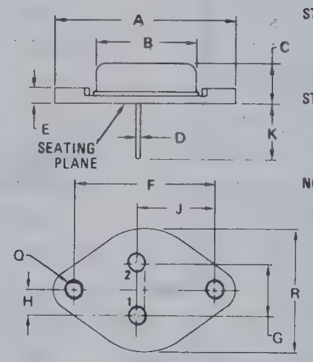
Collector connected to case.

STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR

STYLE 2:
PIN 1. EMITTER
2. BASE
CASE: COLLECTOR

NOTE:
1. DIM "Q" IS DIA

CASE 11-03



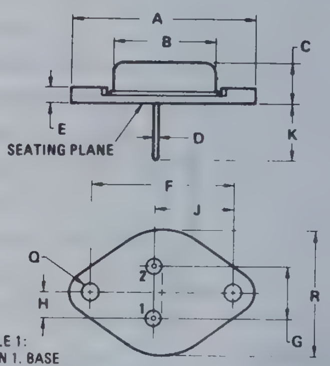
STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR

STYLE 2:
PIN 1. EMITTER
2. BASE
CASE: COLLECTOR

NOTE:
1. DIM "Q" IS DIA.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	39.37	–	1.550
B	–	22.23	–	0.875
C	6.35	11.43	0.250	0.450
D	0.97	1.09	0.038	0.043
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.21	5.72	0.205	0.225
J	16.64	17.15	0.655	0.675
K	11.18	12.19	0 440	0.480
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050

CASE 11A

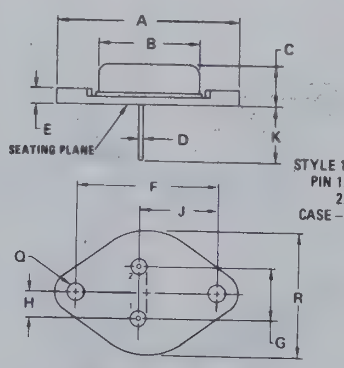


STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	39.37	–	1.550
B	–	21.08	–	0.830
C	–	7.62	–	0.300
D	1.22	1.32	0.048	0.052
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	8 13	10.67	0.320	0.420
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050

Collector connected to case

CASE 12

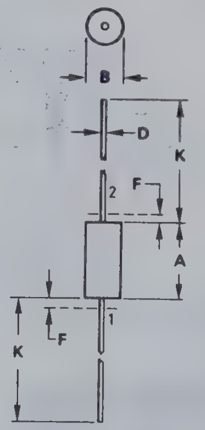


STYLE 1:
PIN 1. BASE
2. EMITTER
CASE – COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	39.37	–	1.550
B	–	21.08	–	0.830
C	–	7.62	–	0.300
D	1.22	1.32	0.048	0.052
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.21	5.72	0.205	0.225
J	16.64	17.15	0.655	0.675
K	11.18	12.19	0.440	0.480
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050

CASE 12-01

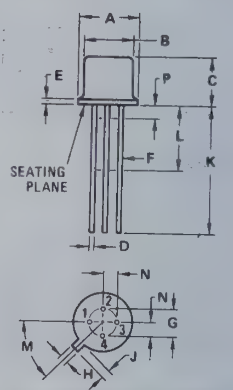
CASE 17



STYLE 1:
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.38	8.89	0.330	0.350
B	3.30	3.68	0.130	0.145
D	0.94	1.09	0.037	0.043
F	–	1.27	–	0.050
K	25.40	31.75	1.000	1.250

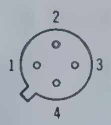
CASE 20-03 TO-72



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0 195
C	4.32	5.33	0.170	0.210
D	0.41	0.53	0.016	0.021
E	–	0.76	–	0.030
F	0.41	0.48	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	1.27 BSC		0.050 BSC	
P	–	1.27	–	0.050

ALL JEDEC dimensions and notes apply

CASE 20 STYLES



STYLE 1
- PIN 1. SOURCE
- 2. DRAIN
- 3. GATE
- 4. CASE LEAD

STYLE 2
- PIN 1. SOURCE
- 2. GATE
- 3. DRAIN
- 4. SUBSTRATE AND CASE LEAD

STYLE 3
- PIN 1. DRAIN
- 2. SOURCE
- 3. GATE
- 4. CASE LEAD

STYLE 4
- PIN 1. SOURCE
- 2. GATE
- 3. DRAIN
- 4. GATE 2 – SUBSTRATE AND CASE

STYLE 5
- PIN 1. SOURCE
- 2. GATE 1
- 3. DRAIN
- 4. CASE

STYLE 6
- PIN 1. DRAIN
- 2. SOURCE AND SUBSTRATE
- 3. GATE
- 4. SOURCE AND SUBSTRATE

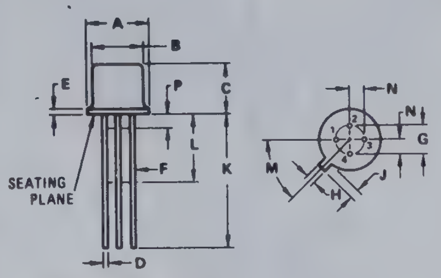
STYLE 7
- PIN 1. DRAIN
- 2. SOURCE
- 3. GATE
- 4. CASE AND SUBSTRATE

STYLE 8
- PIN 1. EMITTER 2
- 2. BASE 1
- 3. COLLECTOR
- 4. EMITTER 1 BASE 2

STYLE 9
- PIN 1. DRAIN
- 2. GATE 2
- 3. GATE 1
- 4. SOURCE, SUBSTRATE AND CASE

STYLE 10
- PIN 1. EMITTER
- 2. BASE
- 3. COLLECTOR
- 4. CASE

CASE 21-02 TO-17

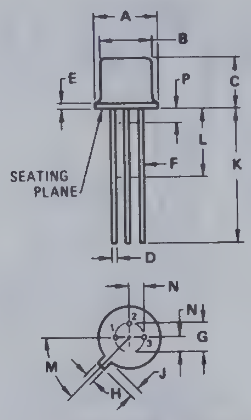


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.70	5.46	0.185	0.215
B	3.81	4.27	0.150	0.168
C	4.19	5.33	0.165	0.210
D	0.406	0.533	0.016	0.021
E	–	0.762	–	0.030
F	0.406	0.483	0.016	0.019
G	1.80 BSC		0.071 BSC	
H	0.762	1.14	0.030	0.045
J	0.711	1.22	0.028	0.048
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	0.914 BSC		0.036 BSC	
P	–	1.27	–	0.050

All JEDEC dimensions and notes apply

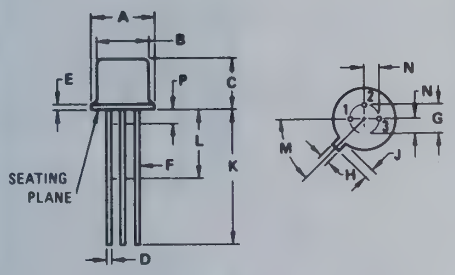
STYLE 1:
- PIN 1. EMITTER
- 2. BASE
- 3. COLLECTOR
- 4. SHIELD

CASE 22-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.32	5.33	0.170	0.210
D	0.41	0.48	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	–	0.500	–
M	45° BSC		45° BSC	
N	1.27 BSC		0.050 BSC	

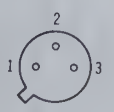
CASE 22-03 TO-18



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.32	5.33	0.170	0.210
D	0.406	0.533	0.016	0.021
E	–	0.762	–	0.030
F	0.406	0.483	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.914	1.17	0.036	0.046
J	0.711	1.22	0.028	0.048
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	1.27 BSC		0.050 BSC	
P	–	1.27	–	0.050

All JEDEC notes and dimensions apply.

CASE 22 STYLES



STYLE 1:
- PIN 1. EMITTER
- 2. BASE
- 3. COLLECTOR

STYLE 2:
- PIN 1. SOURCE,SUBSTRATE AND CASE
- 2. GATE
- 3. DRAIN

STYLE 3:
- PIN 1. SOURCE
- 2. DRAIN
- 3. GATE

STYLE 4:
- PIN 1. SOURCE
- 2. DRAIN
- 3. GATE &CASE

STYLE 5:
- PIN 1. EMITTER
- 2. BASE 1
- 3. BASE 2

STYLE 6:
- PIN 1. CATHODE
- 2. GATE
- 3. ANODE

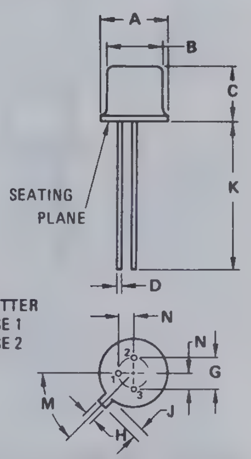
STYLE 7:
- PIN 1. ANODE
- 2. BASE
- 3. CATHODE

STYLE 8:
- PIN 1. GATE
- 2. ANODE 1
- 3. ANODE 2

STYLE 9:
- PIN 1. ANODE 2
- 2. ANODE 1
- 3. GATE (CONNECTED TO CASE)

STYLE 10:
- PIN 1. BASE
- 2. EMITTER
- 3. BASE

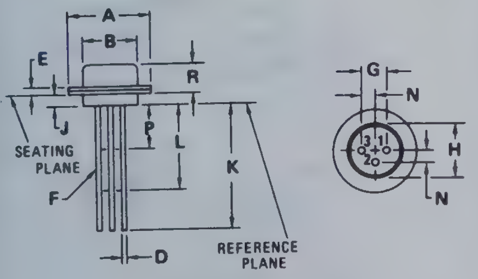
CASE 22A-01



STYLE 1:
- PIN 1. EMITTER
- 2. BASE 1
- 3. BASE 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.32	5.33	0.170	0.210
D	0.41	0.48	0.016	0.019
G	2.54 TYP		0.100 TYP	
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	–	0.500	–
M	45° TYP		45° TYP	
N	1.27 TYP		0.050 TYP	

CASE 23 TO-107

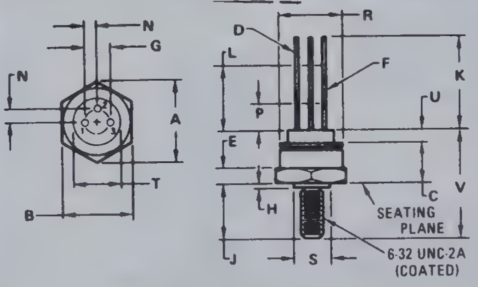


STYLE 1;
- PIN 1. EMITTER
- 2. BASE
- 3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.13	8.89	0.320	0.350
B	5.08	5.46	0.200	0.215
D	0.407	0.533	0.016	0.021
E	–	0.76	–	0.030
F	0.407	0.482	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	4.07	4.32	0.160	0.170
J	1.15	1.52	0.046	0.060
K	12.70	–	0.500	–
L	6.35	–	0.250	–
N	1.27 BSC		0.050 BSC	
P	–	1.27	–	0.050
R	2.67	3.42	0.105	0.135

All JEDEC dimensions and notes apply

CASE 24 TO-102

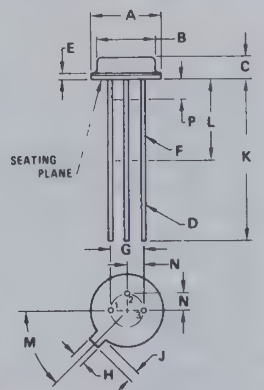


PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.49	11.00	0.413	0.433
B	9.19	9.53	0.362	0.375
C	5.33	5.72	0.210	0.225
D	0.406	0.533	0.016	0.021
E	1.65	1.78	0.065	0.070
F	0.406	0.483	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.508	0.889	0.020	0.035
J	6.73	7.42	0.265	0.292
K	12.70	–	0.500	–
L	6.35	–	0.250	–
N	1.27 BSC		0.050 BSC	
P	–	1.27	–	0.050
R	8.89	9.14	0.350	0.360
S	4.45	4.83	0.175	0.190
T	4.11	4.29	0.162	0.169
U	1.14	1.52	0.045	0.060

All JEDEC dimensions and notes apply

CASE 26-03 TO-46

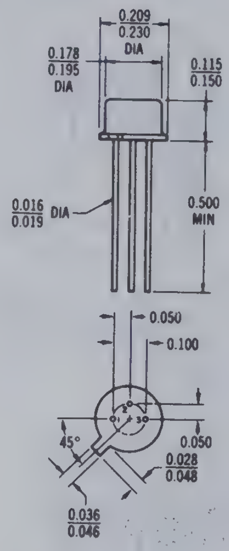


STYLE 1:
- PIN 1. EMITTER
- 2. BASE
- 3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	1.65	2.16	0.065	0.085
D	0.406	0.533	0.016	0.021
E	–	1.02	–	0.040
F	0.305	0.483	0.012	0.019
G	2.54 BSC		0.100 BSC	
H	0.914	1.17	0.036	0.046
J	0.711	1.22	0.028	0.048
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	1.27 BSC		0.050 BSC	
P	–	1.27	–	0.050

All JEDEC dimensions and notes apply

CASE 27 TO-52

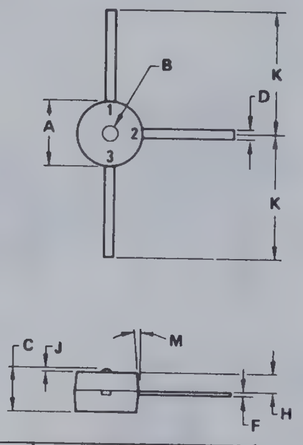


STYLE 1
PIN. 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 2
PIN. 1. DRAIN
2. SOURCE
3. GATE & CASE

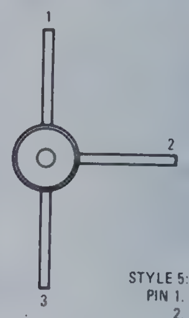
All JEDEC dimensions and notes apply

CASE 28-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.98	2.34	0.078	0.092
B	0.38	0.64	0.015	0.025
C	1.24	1.55	0.049	0.061
D	0.25	0.41	0.010	0.016
F	0.10	0.15	0.004	0.006
H	0.51	0.76	0.020	0.030
J	0.03	0.08	0.001	0.003
K	4.19	4.45	0.165	0.175
M	3°	7°	3°	7°

CASE 28 STYLES



STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 2:
PIN 1. ANODE 2
2. ANODE 1
3. CATHODE

STYLE 3:
PIN 1. CATHODE 2
2. CATHODE 1
3. ANODE

STYLE 4:
PIN 1. CATHODE
2. ANODE
3. COMMON CATHODE ANODE

STYLE 5:
PIN 1. DRAIN
2. SOURCE
3. GATE

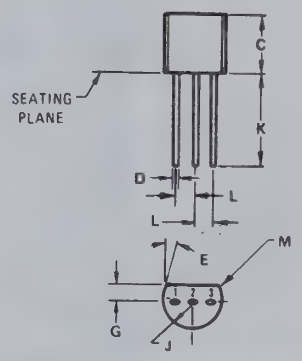
STYLE 6:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

STYLE 7:
PIN 1. BASE 1
2. EMITTER
3. BASE 2

STYLE 8:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 9:
PIN 1. SOURCE
2. GATE
3. DRAIN

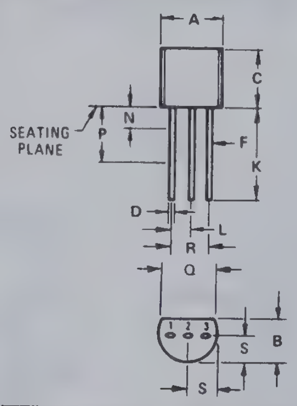
CASE 29-01



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
C	0.175	0.185	4.450	4.700
D	0.016	0.019	0.407	0.482
E	5° NOM		5° NOM	
G	0.045	0.055	1.150	1.390
J	0.085	0.095	2.160	2.420
K	0.500	–	12.700	–
L	0.050 TP		1.270 TP	
M	0.003	0.013	0.076	0.330

(See page 9-39 for lead form availability.)

CASE 29-02 TO-92

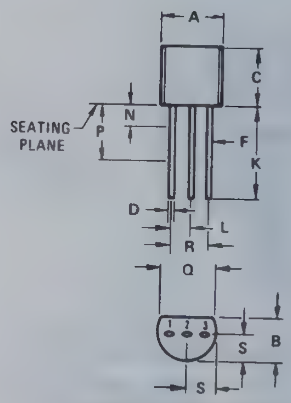


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0 175	0.205	4 450	5.200
B	0.125	0.165	3.180	4.190
C	0.170	0 210	4.320	5.330
D	0.016	0.021	0.407	0.533
F	0.016	0.019	0.407	0.482
K	0.500	–	12.700	–
L	0.045	0.055	1.150	1.390
N	–	0.050	–	1.270
P	0.250	–	6.350	–
Q	0.135	–	3.430	–
R	0.095	0.105	2.410	2.670
S	0.080	0.105	2.030	2.670

All JEDEC dimensions and notes apply

(See page 9-39 for lead form availability.)

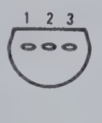
CASE 29-03



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.450	5.200
B	0.125	0.155	3.180	3.940
C	0.170	0.210	4.320	5.330
D	0.016	0.021	0.407	0.533
F	0.016	0.019	0.407	0.482
K	0.500	–	12 700	–
L	0.050 TP		1.270 TP	
N	–	0.050	–	1.270
P	0.250	–	6.350	–
Q	0.135	–	3.430	–
R	0.100 TP		2.540 TP	
S	0.080	0.105	2.030	2.670

(See page 9-39 for lead form availability.)

CASE 29 STYLES



STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 3:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 6:
PIN 1. GATE
2. SOURCE&SUBSTRATE
3. DRAIN

STYLE 7:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 8:
PIN 1. DRAIN
2. GATE
3. SOURCE & SUBSTRATE

STYLE 9:
PIN 1. BASE 1
2. EMITTER
3. BASE 2

STYLE 10:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 11:
PIN 1. ANODE
2. CATHODE & ANODE
3. CATHODE

STYLE 12:
PIN 1. ANODE 1
2. GATE
3. ANODE 2

STYLE 13:
PIN 1. ANODE 1
2. GATE
3. CATHODE 2

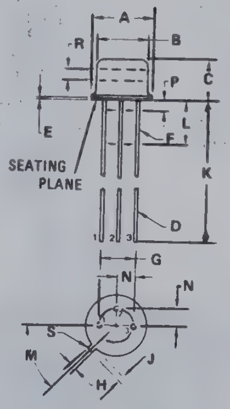
STYLE 14:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

STYLE 15:
PIN 1. ANODE 1
2. CATHODE
3. ANODE 2

STYLE 16:
PIN 1. ANODE
2. GATE
3. CATHODE

STYLE 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

CASE 31-01 TO-5



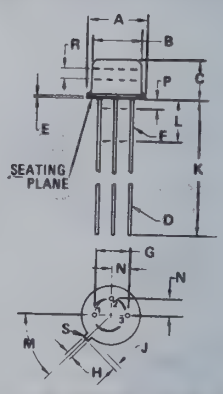
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.75	8.51	0.305	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.48	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	38.10	–	1.500	–
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	

STYLE 1: PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 2: PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 3: PIN 1. GATE
2. CATHODE
3. ANODE

CASE 31-03 TO-5



STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

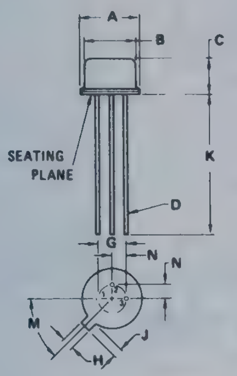
STYLE 2:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 3:
PIN 1. GATE
2. CATHODE
3. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.75	8.51	0.305	0.335
C	6.10	6.60	0.240	0.260
D	0.406	0.533	0.016	0.021
E	0.229	3.18	0.009	0.125
F	0.406	0.483	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.711	0.864	0.028	0.034
J	0.734	1.14	0.029	0.045
K	38.10	–	1.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	
P	–	1.27	–	0.050
R	2.54	–	0.100	–
S	–	0.179	–	0.007

All JEDEC dimensions and notes apply.

CASE 31A-01

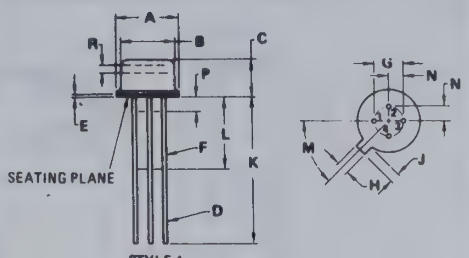

A
B
C
SEATING PLANE
K
D
G
N
N
M
J
H

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.75	8.51	0.305	0.335
C	3.81	4.57	0.150	0.180
D	0.41	0.48	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	12.70	–	0.500	–
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	

NOTE:
1. LEADS WITHIN 0.36 mm (0.014) DIA OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.

CASE 34A TO-12

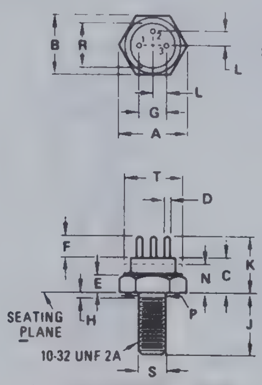

A
R
B
C
P
E
F
L
K
SEATING PLANE
D
G
N
N
M
H
J

STYLE 1:
PIN 1. EMITTER 2
2. BASE 1
3. COLLECTOR 1 (CONNECTED COLLECTOR 2 (TO CASE)
4. EMITTER 1, BASE 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.75	8.51	0.305	0.335
C	6.10	6.60	0.240	0.260
D	0.406	0.533	0.016	0.021
E	0.289	3.18	0.009	0.125
F	0.406	0.483	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.711	0.864	0.028	0.034
J	0.737	1.14	0.029	0.045
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	
P	–	1.27	–	0.050
R	2.54	–	0.100	–
S	–	0.178	–	0.007

JEDEC dimensions and notes apply

CASE 36 TO-60


B
R
L
L
G
A
T
D
F
K
N
C
E
SEATING PLANE
H
P
J
10-32 UNF 2A
S

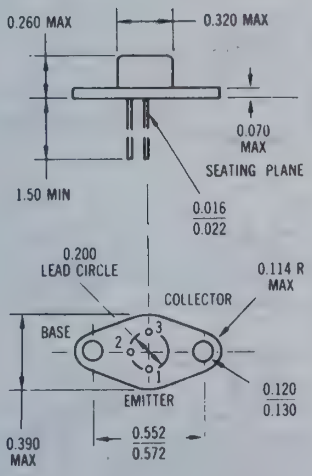
STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
CASE ISOLATED

STYLE 2:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
CASE EMITTER

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.57	13.08	0.495	0.515
B	10.77	11.10	0.424	0.437
C	5.46	8.13	0.215	0.320
D	0.762	1.17	0.030	0.046
E	2.29	3.43	0.090	0.135
G	4.70	5.46	0.185	0.215
H	–	1.98	–	0.078
J	9.53	11.56	0.375	0.455
K	9.02	12.19	0.355	0.480
L	2.29	2.79	0.090	0.110
N	–	4.19	–	0.165
P	4.14	4.80	0.163	0.189
R	8.13	9.14	0.320	0.360
T	9.14	11.10	0.360	0.437

All JEDEC dimensions and notes apply

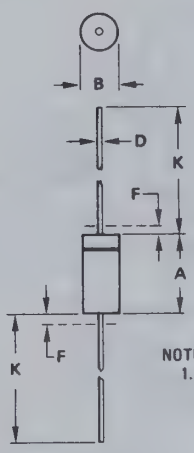
CASE 39 TO-37


0.260 MAX
0.320 MAX
0.070 MAX
SEATING PLANE
1.50 MIN
0.016
0.022
0.200 LEAD CIRCLE
0.114 R MAX
COLLECTOR
BASE
2
3
1
EMITTER
0.120
0.130
0.390 MAX
0.552
0.572

All JEDEC dimensions and notes apply

Collector connected to case

CASE 41



NOTE:
1. LEAD FINISH & DIA UNCONTROLLED IN AREA "F".

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	25.40	–	1.000
B	–	12.70	–	0.500
D	0.76	0.86	0.030	0.034
F	–	1.27	–	0.050
K	31.75	–	1.250	–

-01

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	26.16	–	1.030
B	–	9.60	–	0.378
D	0.76	0.86	0.030	0.034
F	–	1.27	–	0.050
K	31.75	–	1.250	–

-03

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	30.99	–	1.220
B	–	16.28	–	0.641
D	0.76	0.86	0.030	0.034
F	–	1.27	–	0.050
K	44.45	–	1.750	–

-04

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	16.64	–	0.655
B	–	16.28	–	0.641
D	0.76	0.86	0.030	0.034
F	–	1.27	–	0.050
K	31.75	–	1.250	–

-05

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	13.21	–	0.520
B	-	6.98	–	0.275
D	0.46	0.56	0.018	0.022
F	–	1.27	–	0.050
K	31.75	–	1.250	–

-06

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	13.21	–	0.520
B	6.10	6.60	0.240	0.260
D	0.71	0.81	0.028	0.032
F	–	1.27	–	0.050
K	25.40	–	1.000	–

-08

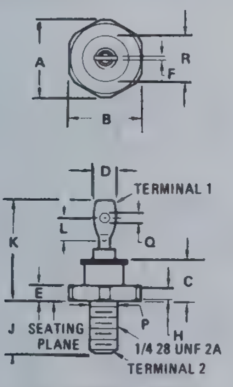
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	19.81	–	0.780
B	6.10	6.60	0.240	0.260
D	0.58	0.81	0.023	0.032
F	–	1.27	–	0.050
K	25.40	–	1.000	–

-09

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	29.34	–	1.155
B	7.70	8.20	0.303	0.323
D	0.71	0.81	0.028	0.032
F	–	1.27		0.050
K	25.40	–	1.000	–

-10

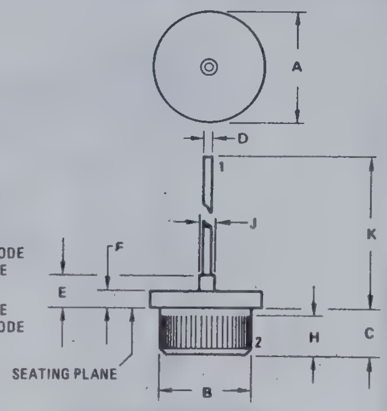
CASE 42A DO-5


A
R
F
B
D
TERMINAL 1
K
L
Q
C
E
J
SEATING PLANE
P
H
1/4 28 UNF 2A
TERMINAL 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	20.04	20.29	0.789	0.799
B	16.94	17.45	0.667	0.687
C	–	11.43	–	0.450
D	–	9.53	–	0.375
E	2.92	5.08	0.115	0.200
F	–	2.03	–	0.080
H	1.52	–	0.060	–
J	10.72	11.51	0.422	0.453
K	–	25.40	–	1.000
L	3.96	–	0.156	–
P	5.59	6.32	0.220	0.249
Q	3.56	4.45	0.140	0.175
R	–	16.94	–	0.667

All JEDEC dimensions and notes apply

CASE 43-02 DO-21

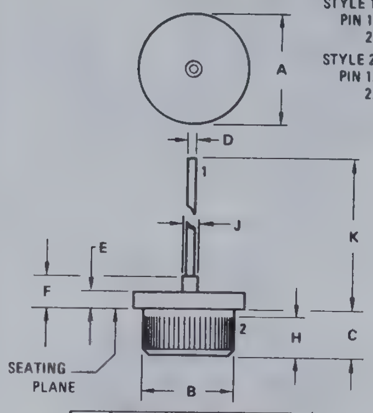

A
D
1
J
K
F
E
2
H
C
SEATING PLANE
B

STYLE 1:
PIN 1. CATHODE
2. ANODE

STYLE 2:
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	15.494	16.256	0.610	0.640
B	12.725	12.827	0.501	0.505
C	5.08	6.35	0.200	0.250
D	1.193	1.346	0.047	0.053
E	–	10.77	–	0.424
F	2.032	4.826	0.080	0.190
H	4.572	6.350	0.180	0.250
J	–	3.556	–	0.140
K	12.70	–	0.500	–

CASE 43-04

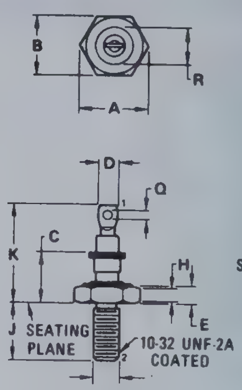

A
D
1
J
K
E
F
2
H
C
SEATING PLANE
B

STYLE 1:
PIN 1. CATHODE
2. ANODE

STYLE 2:
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	15.49	16.26	0.610	0.640
B	12.73	12.83	0.501	0.505
C	5.08	6.35	0.200	0.250
D	2.46	2.62	0.097	0.103
E	2.03	4.83	0.080	0.190
H	5.08	6.35	0.200	0.250
J	–	3.56	–	0.140
K	–	15.24	–	0.600

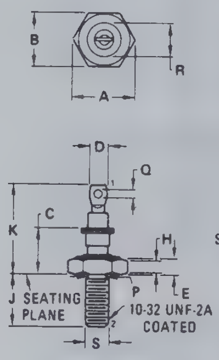
CASE 44-01


B
R
A
D
Q
1
C
K
H
J SEATING PLANE
E
10-32 UNF-2A COATED
2

STYLE 1:
TERM. 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.70	12.95	0.500	0.510
B	10.77	11.10	0.424	0.437
C	–	10.29	–	0.405
D	–	6.35	–	0.250
E	1.91	4.45	0.075	0.175
J	10.72	11.51	0.422	0.453
K	–	20.32	–	0.800
Q	1.52	–	0.060	–
R	–	6.22	–	0.245

CASE 44-02 DO-4

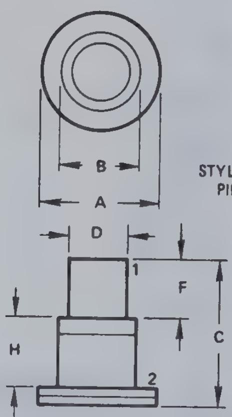

B
R
A
D
Q
C
K
H
J SEATING PLANE
P
E
10-32 UNF-2A COATED
2
S

STYLE 1:
TERM. 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
B	10.77	11.10	0.424	0.437
C	–	10.29	–	0.405
D	–	6.35	–	0.250
E	1.91	4.45	0.075	0.175
H	1.52	–	0.060	–
J	10.72	11.51	0.422	0.453
K	–	20.32	–	0.800
Q	1.52	–	0.060	–
R	–	10.77	–	0.424
P	4.14	4.80	0.163	0.189
S	4.31 REF		.1697 REF	

All JEDEC dimensions and notes apply.

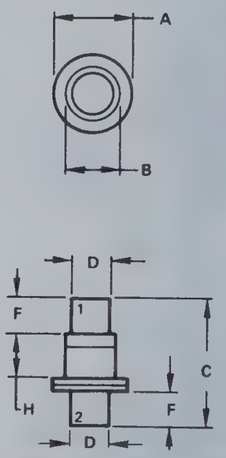
CASE 45-01



STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.97	3.30	0.117	0.130
B	1.96	2.21	0.077	0.087
C	3.78	4.09	0.149	0.161
D	1.52	1.68	0.060	0.066
F	1.50	1.65	0.059	0.065
H	1.78	1.93	0.070	0.076

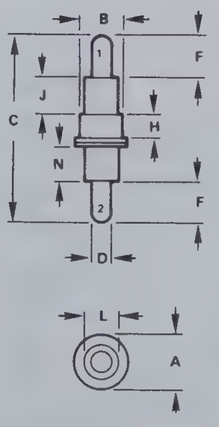
CASE 46-01


A
B
D
F
1
C
H
2
F
D

STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.97	3.30	0.117	0.130
B	1.96	2.21	0.077	0.087
C	5.21	5.72	0.205	0.225
D	1.52	1.68	0.060	0.066
F	1.50	1.65	0.059	0.065
H	1.78	1.93	0.070	0.076

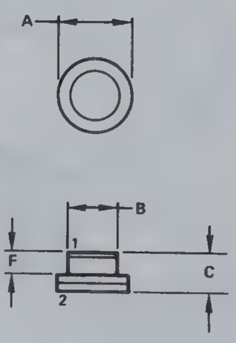
CASE 47-01


B
1
F
J
C
H
N
2
F
D
L
A

STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.72	6.22	0.225	0.245
B	4.70	4.95	0.185	0.195
C	19.18	20.19	0.755	0.795
D	2.24	2.49	0.088	0.098
F	4.57	4.83	0.180	0.190
H	2.29	2.54	0.090	0.100
J	3.68	4.06	0.145	0.160
L	3.94	4.19	0.155	0.165
N	3.18	3.43	0.125	0.135

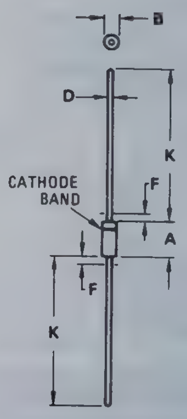
CASE 48-01



STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.97	3.30	0.117	0.130
B	1.96	2.11	0.077	0.083
C	1.27	1.78	0.050	0.070
F	0.33	0.69	0.013	0.027

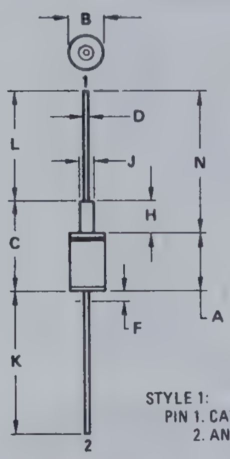
CASE 51-02 DO-7


B
D
K
CATHODE BAND
F
A
F
K

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.84	7.62	0.230	0.300
B	2.16	2.72	0.085	0.107
D	0.46	0.56	0.018	0.022
F	–	1.27	–	0.050
K	25.40	–	1.000	–

All JEDEC dimensions and notes apply

CASE 52-03 DO-13

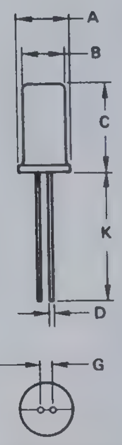

B
1
D
L
J
N
H
C
F
A
K
2

STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.44	9.07	0.293	0.357
B	5.46	5.97	0.215	0.235
C	–	14.48	-	0.570
D	0.64	0.89	0.025	0.035
F	--	4.78	--	0.188
J	1.14	2.54	0.045	0.100
K	25.40	41.28	1.000	1.625
L	25.40	41.28	1.009	1.625

All JEDEC dimensions and notes apply

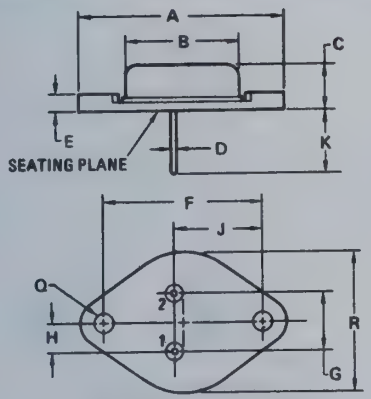
CASE 53



NOTE:
1. POLARITY INDICATED BY CATHODE DOT ON BODY ADJACENT TO CATHODE LEAD.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.33	5.84	0.210	0.230
B	4.57	5.08	0.180	0.200
C	8.89	9.40	0.350	0.370
D	0.48	0.56	0.019	0.022
G	1.14	1.40	0.045	0.055
K	26.97	–	1.062	–

CASE 54-03


A
B
C
E
SEATING PLANE
D
K
F
J
Q
2
1
H
R
G

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	39.12	–	1.540
B	–	20.70	–	0.815
C	–	7.92	–	0.312
D	1.22	1.30	0.048	0.051
E	2.84	3.05	0.112	0.120
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.54	16.79	0.651	0.661
K	9.65	10.16	0.380	0.400
Q	3.84	4.09	0.151	0.161
R	–	26.16	–	1.030

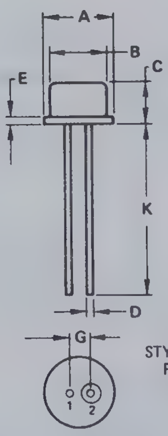
STYLE 1: (THY)
PIN 1. ANODE
2. GATE
CASE: CATHODE

STYLE 2: (THY)
PIN 1. GATE
2. CATHODE
CASE: ANODE

STYLE 3: (ZENER)
PIN 1. CATHODE
2. CATHODE
CASE: ANODE

STYLE 4: (ZENER)
PIN 1. ANODE
2. ANODE
CASE: CATHODE

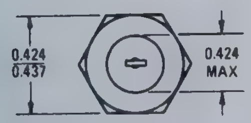
CASE 55-01



STYLE 1:
PIN 1. CATHODE
2. ANODE

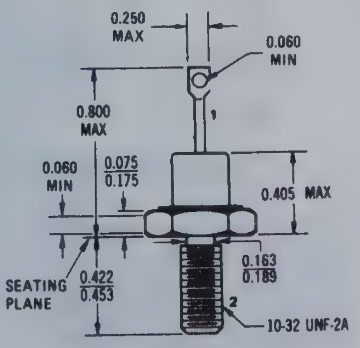
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	10.59	–	0.417
B	–	8.59	–	0.338
C	–	6.50	–	0.256
D	0.99	1.09	0.039	0.043
E	–	1.19	–	0.047
G	2.92	3.43	0.115	0.135
K	22.35	25.40	0.880	1.000

CASE 56 DO-4


0.424
0.437
0.424
MAX

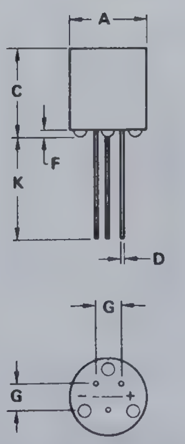
STYLE 1:
PIN 1. CATHODE
2. ANODE

STYLE 2:
PIN 1. ANODE
2. CATHODE


0.250
MAX
0.060
MIN
0.800
MAX
1
0.060
MIN
0.075
0.175
0.405 MAX
SEATING
PLANE
0.422
0.453
0.163
0.189
2
10-32 UNF-2A

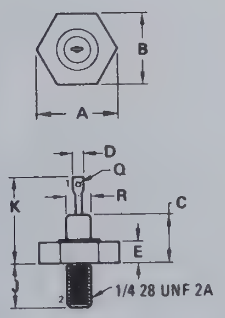
All JEDEC dimensions and notes apply

CASE 57



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	14.22	–	0.560
C	–	16.26	–	0.640
D	0.74	0.89	0.029	0.035
F	–	1.02	–	0.040
G	5.08 BSC		0.200 BSC	
K	19.05	–	0.750	–

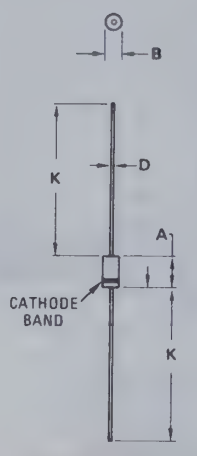
CASE 58


B
A
D
Q
R
C
K
E
J
2
1/4 28 UNF 2A

STYLE 1:
TERM. 1. CATHODE
2. ANODE
STYLE 2:
TERM. 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.92	19.18	0.745	0.755
B	16.94	17.45	0.667	0.687
C	–	11.94	-	0.470
D	3.18	NOM	0.125	NOM
E	2.92	5.08	0.115	0.200
J	10.72	11.51	0.422	0.453
K	–	21.34	–	0.840
Q	1.78	NOM	0.070	NOM
R	–	7.11	–	0.280

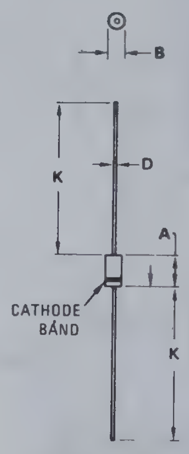
CASE 59-01 DO-41



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.70	5.20	0.185	0.205
B	2.54	2.71	0.100	0.107
D	0.76	0.86	0.030	0.034
K	27.94	–	1.100	–

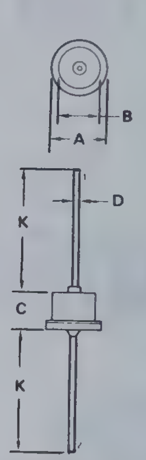
CONFORMS TO DO-41

CASE 59-02



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.13	8.38	0.320	0.330
B	3.73	3.99	0.147	0.157
D	0.76	0.86	0.030	0.034
K	27.94	–	1.100	–

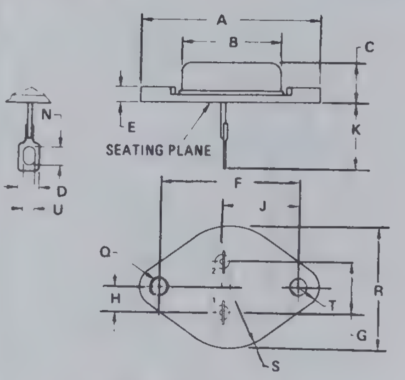
CASE 60



STYLE 1:
PIN 1. CATHODE
2. ANODE
STYLE 2:
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	11.43	–	0.450
B	–	8.89	–	0.350
C	–	7.62		0.300
D	1.17	1.42	0.046	0.056
K	24.89	–	0.980	–

CASE 61 TO-41

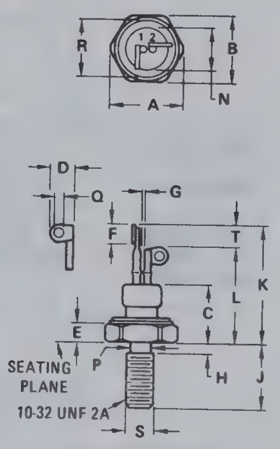


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	38.86	39.37	1.530	1.550
B	20.57	21.08	0.810	0.830
C	9.91	10.41	0.390	0.410
D	4.83	5.33	0.190	0.210
E	3.18	3.43	0.125	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	16.51	17.27	0.650	0.680
N	3.30	4.32	0.130	0.170
Q	3.84	4.09	0.151	0.161
R	26.16	26.67	1.030	1.050
U	1.83	3.05	0.072	0.120

STYLE 1:
PIN 1. GATE
2. CATHODE
CASE: ANODE

All JEDEC dimensions and notes apply

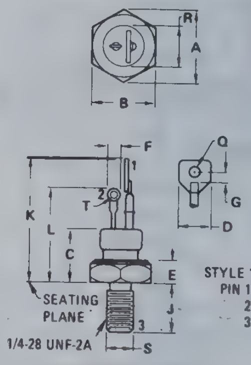
CASE 63-02



STYLE 1.
PIN 1. CATHODE
2. GATE
STUD – ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.57	12.83	0.495	0.505
B	10.77	11.10	0.424	0.437
C	–	10.80	–	0.425
D	3.94	4.70	0.155	0.185
E	–	3.56	–	0.140
J	10.16	11.51	0.400	0.453
K	–	21.72	–	0.855
L	–	17.78	–	0.700
N	–	7.11	–	0.280
Q	1.02	1.91	0.040	0.075

CASE 64-02 TO-48

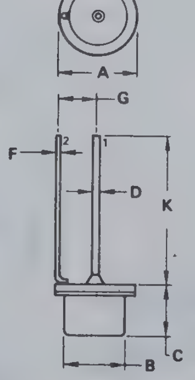


STYLE 1:
PIN 1. CATHODE
2. GATE
3. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	16.51	–	0.650
B	13.82	14.27	0.544	0.562
C	8.40	12.80	0.330	0.505
D	5.34	7.62	0.210	0.300
E	2.88	5.08	0.113	0.200
F	2.93	3.55	0.115	0.140
G	3.05	–	0.120	–
H	–	2.28	–	0.090
J	10.72	11.50	0.422	0.453
K	23.11	30.30	0.910	1.193
P	5.59	6.32	0.220	0.249
Q	3.18	4.19	0.125	0.165
R	–	13.82	–	0.544
S	5.652	5.760	0.2225	0.2268
T	3.18	–	0.125	–
U	1.53	1.90	0.060	0.075

All JEDEC dimensions and notes apply

CASE 70

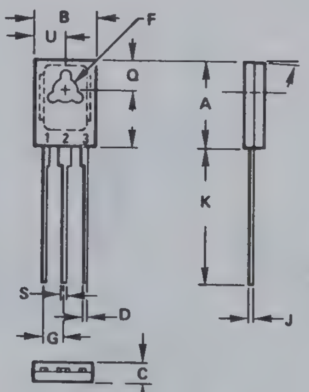


STYLE 1:
PIN 1. ANODE
2. CATHODE

STYLE 2:
PIN 1. CATHODE
2. ANODE

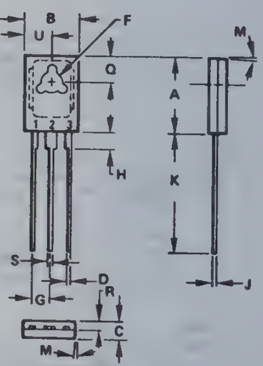
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.16	12.70	0.400	0.500
B	7.62	8.89	0.300	0.350
C	6.60	8.89	0.260	0.350
D	1.17	1.42	0.046	0.056
F	0.69	0.94	0.027	0.037
K	22.86	–	0.900	–

CASE 77-02



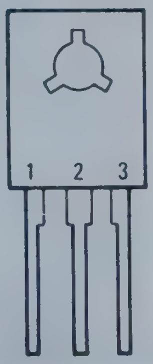
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.91	11.43	0.390	0.450
B	6.86	8.38	0.270	0.330
C	1.78	3.30	0.070	0.130
D	0.51	0.66	0.020	0.026
F	2.92	3.00	0.115	0.118
G	2.29 BSC		0.090 BSC	
J	0.38	0.64	0.015	0.025
K	15.11	16.64	0.595	0.655
Q	3.30	4.45	0.130	0.175
S	0.64	0.89	0.025	0.035
U	3.81 NOM		0.150 NOM	

CASE 77-03



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.80	11.05	0.425	0.435
B	7.49	7.75	0.295	0.305
C	2.41	2.67	0.095	0.105
D	0.51	0.66	0.020	0.026
F	2.92	3.00	0.115	0.118
G	2.36 BSC		0.093 BSC	
H	2.16	2.41	0.085	0.095
J	0.38	0.64	0.015	0.025
K	15.38	16.64	0.605	0.655
M	3° TYP		3° TYP	
Q	3.76	4.01	0.148	0.158
R	1.14	1.40	0.045	0.055
S	0.64	0.89	0.025	0.035
U	3.68	3.94	0.145	0.155

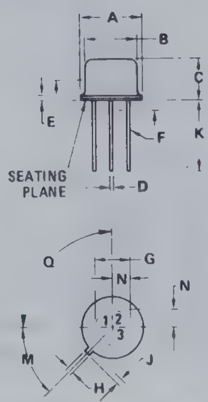
CASE 77STYLES



STYLE 1
PIN 1. EMITTER
2. COLLECTOR
3. BASE
STYLE 2
PIN 1. CATHODE
2. ANODE
3. GATE
STYLE 3
PIN 1. BASE
2. COLLECTOR
3. EMITTER
STYLE 4
PIN 1. ANODE 1
2. ANODE 2
3. GATE
STYLE 5
PIN 1. MT1
2. MT2
3. GATE

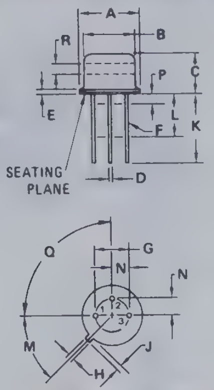
NOTE:
1. MT = MAIN TERMINAL

CASE 79-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.48	0.016	0.019
E	0.23	3.18	0.009	0.125
F	0.41	0.48	0.016	0.019
G	4.83	5.33	0.190	0.210
H	0.71	0.86	0.028	0.034
J	0.74	1.02	0.029	0.040
K	12.70	–	0.500	–
M	45° NOM		45° NOM	
N	2.54 BSC		0.100 BSC	
Q	90° NOM		90° NOM	

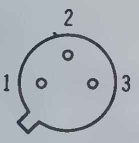
CASE 79-02 TO-39



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0 240	0.260
D	0.406	0.533	0.016	0.021
E	0.229	3.18	0.009	0.125
F	0.406	0.483	0.016	0.019
G	4.83	5.33	0.190	0.210
H	0.711	0.864	0.028	0.034
J	0.737	1.02	0.029	0.040
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
Q	90° NOM		90° NOM	
R	2.54	–	0.100	–

All JEDEC notes and dimensions apply.

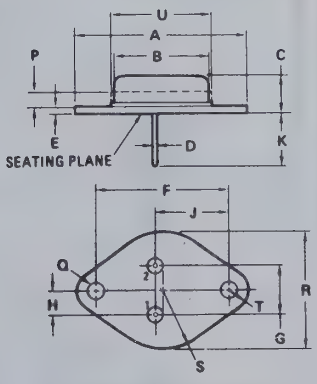
CASE 79 STYLES



STYLE 1
PIN 1. EMITTER
2. BASE
3. COLLECTOR
STYLE 2
PIN 1. DRAIN
2. SOURCE
3. GATE
STYLE 3
PIN 1. CATHODE
2. GATE
3. ANODE
STYLE 4:
PIN 1. MAIN TERM. 1
2. GATE
3. MAIN TERM. 2

CASE 80-02 TO-66

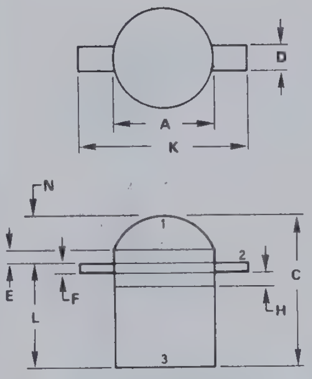
STYLE 1
PIN 1. BASE
2. EMITTER
CASE COLLECTOR
STYLE 2
PIN 1 BASE
2 EMITTER
CASE COLLECTOR



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
B	11.94	12.70	0.470	0.500
C	6.35	8.64	0.250	0.340
D	0.71	0.86	0.028	0.034
E	1.27	1.91	0.050	0.075
F	24.33	24.43	0.958	0.962
G	4.83	5.33	0 190	0.210
H	2 41	2 67	0 095	0.105
J	14.48	14.99	0.570	0.590
K	9.14	-	0.360	
P	–	1.27	-	0.050
Q	3.61	3.86	0.142	0.152
S	–	8.89	–	0 350
T	–	3.68	-	0 145
U	–	15.75	-	0.620

All JEDEC Dimensions and and Notes Apply.

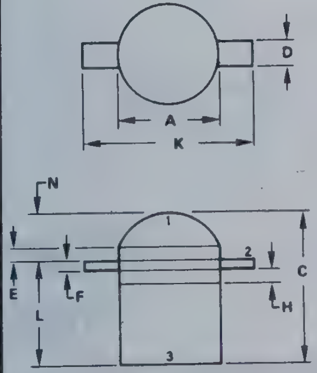
CASE 81A-03



STYLE 1:
PIN 1. LENS
2. EMITTER
3. COLLECTOR
STYLE 2:
PIN 1. LENS
2. ANODE
3. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.47	1.57	0.058	0.062
C	–	3.18	–	0.125
D	0.46	0.56	0.018	0.022
E	0.20	0.30	0.008	0.012
F	0.08	0.18	0.003	0.007
H	0.36	0.51	0.014	0.020
K	2.11	2.36	0.083	0.093
L	2.08	2.39	0.082	0.094
N	0.58	0.79	0.023	0.031

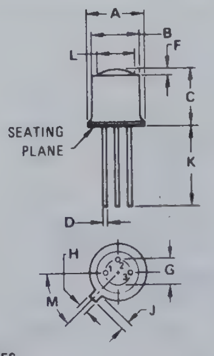
CASE 81A-04



STYLE 1:
PIN 1. LENS
2. EMITTER
3. COLLECTOR
STYLE 2:
PIN 1. LENS
2. ANODE
3. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.47	1.57	0.058	0.062
C	–	2.67	–	0.105
D	0.46	0.56	0.018	0.022
E	0.20	0.30	0.008	0.012
F	0.08	0.18	0.003	0.007
H	0.36	0.51	0.014	0.020
K	2.11	2.36	0.083	0.093
L	1.57	1.83	0.062	0.072
N	0.38	0.84	0.015	0.033

CASE 82-01



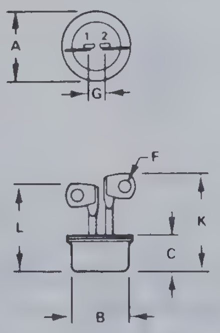
STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 2:
PIN 1. CATHODE
2. GATE
3. ANODE

NOTES:
1. LEADS WITHIN .13 mm (.005) RADIUS OF TRUE POSITION AT SEATING PLANE, AT MAXIMUM MATERIAL CONDITION.
2. PIN 3 INTERNALLY CONNECTED TO CASE.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	5.08	6.35	0.200	0.250
D	0.41	0.48	0.016	0.019
F	0.51	1.02	0.020	0.040
G	2.54 BSC		0.100 BSC	
H	0.99	1.17	0.039	0.046
J	0.84	1.22	0.033	0.048
K	12.70	–	0.500	–
L	3.35	4.01	0.132	0.158
M	45° BSC		45° BSC	

CASE 85



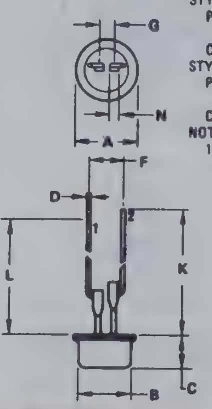
STYLE 1
PIN 1 GATE
2 CATHODE
CAN ANODE

STYLE 2
PIN 1 GATE
2 MAIN TERMINAL 1
CAN MAIN TERMINAL 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	10.92	–	0.430
B	–	8.89	-	0 350
C	–	5.97	–	0 235
F	1.78 TYP		0 070 TYP	
G	2.29	2.79	0 090	0 110
K	–	14 73	–	0 580
L	–	13.46	–	0 530

NOTE
1 DIM "G" MEASURED AT CAN

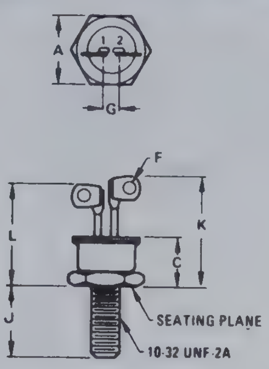
CASE 85L-02



STYLE 1:
PIN 1. GATE
2. CATHODE
CAN. ANODE
STYLE 2:
PIN 1. GATE
2. MAIN TERMINAL 1
CAN. MAIN TERMINAL 2
NOTES:
1. DIM "G" MEASURED AT CAN

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	10.92	–	0.430
B	–	8.89	–	0.350
C	–	5.97	–	0.235
D	0.76	0.86	0.030	0.034
F	4.83	5.33	0.190	0.210
G	2.29	2.79	0.090	0.110
K	33.53	–	1.320	–
L	31.50 TYP		1.240 TYP	
N	1.65	1.91	0.065	0.075

CASE 86



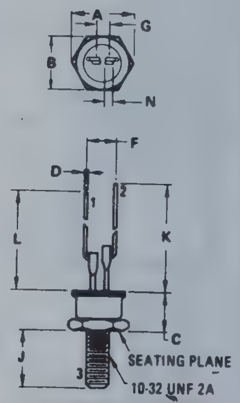
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	11.10	–	0.437
C	–	7.87	–	0.310
F	1.78 TYP		0.070 TYP	
G	2.29	2.79	0.090	0.110
J	10.72	11.48	0.422	0.452
K	–	16.76	–	0.660
L	–	15.49	–	0.610

NOTE:
1. DIM "G" MEASURED AT CAN.

STYLE 1:
PIN 1. GATE
2. CATHODE
STUD: ANODE

STYLE 2:
PIN 1. GATE
2. MAIN TERMINAL 1
STUD: MAIN TERMINAL 2

CASE 86L-02

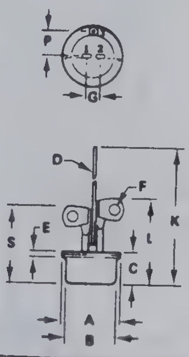


STYLE 1:
TERM. 1. GATE
2. CATHODE
3. ANODE

STYLE 2:
TERM. 1. GATE
2. CATHODE
3. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	12.82	–	0.505
B	–	11.10	–	0.437
C	–	7.87	–	0.310
D	0.76	0.86	0.030	0.034
F	4.83	5.33	0.190	0.210
G	2.29	2.79	0.090	0.110
J	10.72	11.48	0.422	0.452
K	33.53	–	1.320	–
L	31.50 TYP		1.240 TYP	
N	1.65	1.91	0.065	0.075

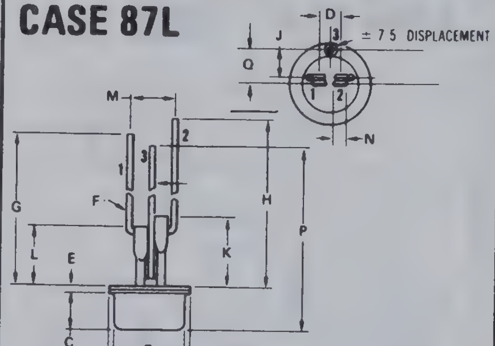
CASE 87 -02



STYLE 1:
PIN 1. GATE
2. CATHODE
3. ANODE
STYLE 2:
PIN 1. GATE
2. MAIN TERMINAL 1
3. MAIN TERMINAL 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	10.92	–	0.430
B	–	8.89	–	0.350
C	–	4.70	–	0.185
D	0.76	0.86	0.030	0.034
E	0.76	1.27	0.030	0.050
F	1.78 TYP		0.070 TYP	
G	2.29	2.79	0.090	0.110
K	30.48	–	1.200	–
L	–	14.73	–	0.580
P	4.57	5.08	0.180	0.200
S	–	13.46	–	0.530

CASE 87L



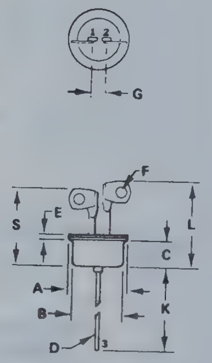
NOTES
1. DIM. "D" MEASURED AT CAN.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	–	0.430	–	10.920
B	–	0.350	–	8.890
C	–	0.185	–	4.700
D	0.090	0.110	2.290	2.790
E	0.030	0.050	0.762	1.270
F	0.030	0.034	0.762	0.864
G	1.240 TYP		31.500 TYP	
H	1.320	–	33.530	–
J	0.135	0.145	3.430	3.680
K	–	0.320	–	8.130
L	–	0.270	–	6.860
M	0.190	0.210	4.830	5.330
N	0.065	0.075	1.650	1.910
P	1.200	–	30.480	–
Q	0.180	0.200	4.570	5.080

STYLE 1:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 2:
PIN 1. GATE
2. MAIN TERMINAL 1
3. MAIN TERMINAL 2

CASE 88-01

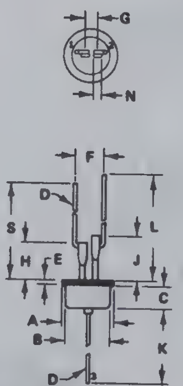


STYLE 1:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 2:
PIN 1. GATE
2. MAIN TERM. 1
3. MAIN TERM. 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	10.92	–	0.430
B	–	8.89	–	0.350
C	–	4.70	–	0.185
D	0.76	0.86	0.030	0.034
E	0.76	1.27	0.030	0.050
F	1.78 TYP		0.070 TYP	
G	2.29	2.79	0.090	0.110
K	22.86	–	0.900	–
L	–	14.73	–	0.580
S	–	13.46	–	0.530

CASE 88L-01

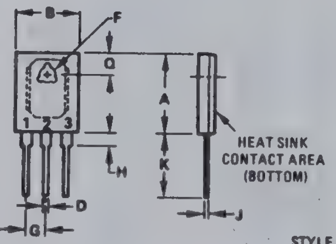


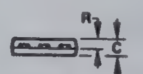
STYLE 1:
PIN 1. GATE
2. CATHODE
3. ANODE
STYLE 2:
PIN 1. GATE
2. MAIN TERM. 1
3. MAIN TERM. 2

NOTE:
1. DIM "G" MEASURED AT CAN.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	10.92	–	0.430
B	–	8.89	–	0.350
C	–	4.70	–	0.185
D	0.76	0.86	0.030	0.034
E	0.76	1.27	0.030	0.050
F	4.83	5.33	0.190	0.210
G	2.29	2.79	0.090	0.110
H	–	6.86	–	0.270
J	–	8.13	–	0.320
K	22.86	–	0.900	–
L	33.53	–	1.320	–
N	1.65	1.91	0.065	0.075
S	31.50		1.240	

CASE 90-04

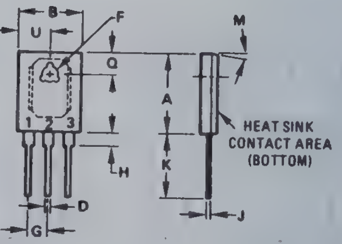


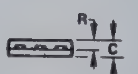


STYLE 1:
PIN 1. CATHODE
2. ANODE
3. GATE
STYLE 2:
PIN 1. EMITTER
2. COLLECTOR
3. BASE
STYLE 3:
PIN 1. CATHODE
2. GATE
3. ANODE
STYLE 4:
PIN 1. MT 1
2. MT 2
3. GATE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	15.95	16.71	0.628	0.658
B	12.45	13.21	0.490	0.520
C	3.05	3.81	0.120	0.150
D	1.09	1.25	0.043	0.049
F	3.51	3.76	0.138	0.148
G	4.22 BSC		0.166 BSC	
H	–	3.18	–	0.125
J	0.76	0.86	0.030	0.034
K	14.99	16.51	0.590	0.650
Q	4.50	5.00	0.177	0.197
R	1.91	2.16	0.075	0.085

CASE 90-05

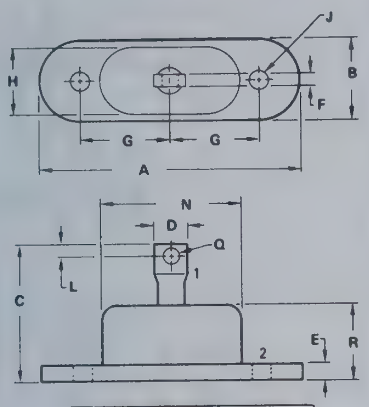




STYLE 1:
PIN 1. CATHODE
2. ANODE
3. GATE
STYLE 2:
PIN 1. EMITTER
2. COLLECTOR
3. BASE
STYLE 3:
PIN 1. CATHODE
2. GATE
3. ANODE
STYLE 4:
PIN 1. MT 1
2. MT 2
3. GATE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.13	16.38	0.635	0.645
B	12.57	12.83	0.495	0.505
C	3.18	3.43	0.125	0.135
D	1.09	1.24	0.043	0.049
F	3.51	3.76	0.138	0.148
G	4.22 BSC		0.166 BSC	
H	2.67	2.92	0.105	0.115
J	0.813	0.864	0.032	0.034
K	15.11	16.38	0.595	0.645
M	9° TYP		9° TYP	
Q	4.70	4.95	0.185	0.195
R	1.91	2.16	0.075	0.085
U	6.22	6.48	0.245	0.255

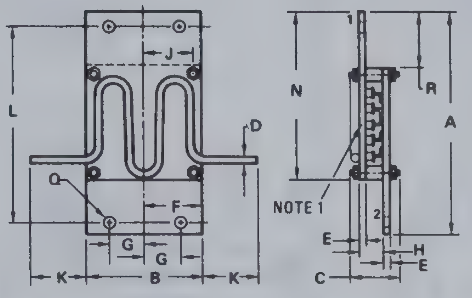
CASE 100-01


J
H
B
F
G
G
A
N
D
Q
1
C
L
E
R
2

STYLE 1
1. CATHODE
2. ANODE
STYLE 2
1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	55.88	–	2.200
B	–	16.51	–	0.650
C	29.21 NOM		1.150 NOM	
D	6.60 NOM		0.260 NOM	
E	–	3.43	–	0.135
F	2.03 NOM		0.080 NOM	
G	18.80	19.30	0.740	0.760
H	–	15.24	–	0.600
J	4.39 NOM		0.173 NOM	
L	2.62	–	0.103	–
N	–	30.48	–	1.200
Q	3.68 NOM		0.145 NOM	
R	–	16.13	–	0.635

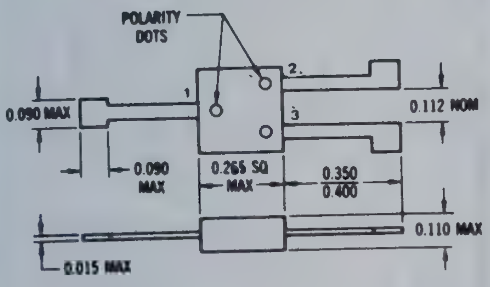
CASE 105-01


J
L
D
Q
F
G
G
K
B
K
1
N
R
A
NOTE 1
2
E
H
E
C

STYLE 1:
TERM 1. CATHODE
2. ANODE
STYLE 2:
TERM. 1. ANODE
2. CATHODE
NOTE:
1. CASE TEMPERATURE REFERENCE POINT

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	203.20	–	8.000
B	101.09	102.11	3.980	4.020.
C	–	50.80	–	2.000
D	6.35 NOM		0.250 NOM	
E	6.35 TYP		0.250 TYP	
G	31.50	32.00	1.240	1.260
H	20.37	20.88	0.802	0.822
K	50.80 TYP		2.000 TYP	
L	176.53	179.07	6.950	7.050
N	152.40 TYP		6.000 TYP	
Q	10.31 NOM		0.406 NOM	
R	50.80 TYP		2.000 TYP	

CASE 106

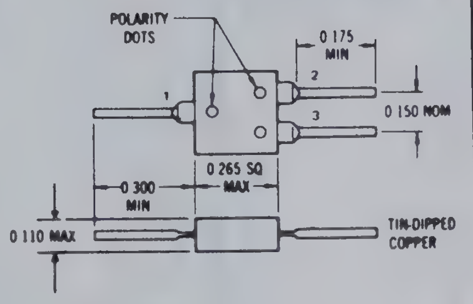

POLARITY DOTS
2
1
3
0.090 MAX
0.112 NOM
0.090 MAX
0.265 SQ MAX
0.350
0.400
0.110 MAX
0.015 MAX

STYLE 1:
PIN 1. AC
2. POSITIVE
3. NEGATIVE

STYLE 2:
PIN 1. POSITIVE
2. AC
3. AC

STYLE 3:
PIN 1. NEGATIVE
2. AC
3. AC

CASE 107


POLARITY DOTS
0.175 MIN
2
1
3
0.150 NOM
0.300 MIN
0.265 SQ MAX
0.110 MAX
TIN-DIPPED COPPER

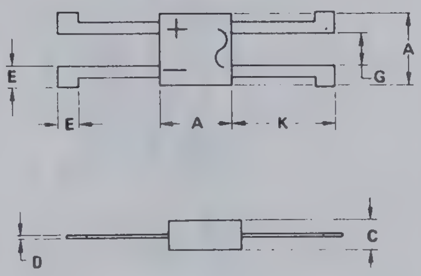
Leads formed to fit into a hole 0.037 min.

STYLE 1:
PIN 1. AC
2. POSITIVE
3. NEGATIVE

STYLE 2:
PIN 1. POSITIVE
2. AC
3. AC

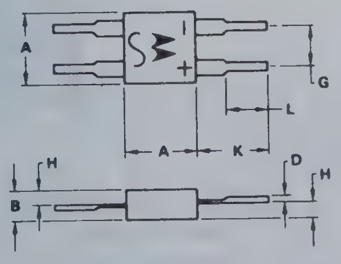
STYLE 3:
PIN 1. NEGATIVE
2. AC
3. AC

CASE 108-01



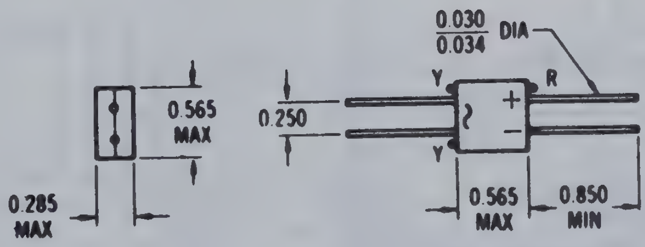
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	6.730	–	0.265
C	–	2.790	–	0.110
D	–	0.508	–	0.020
E	–	2.290	–	0.090
G	2.85 NOM		0.112 NOM	
K	8.89	10.160	0.350	0.400

CASE 109

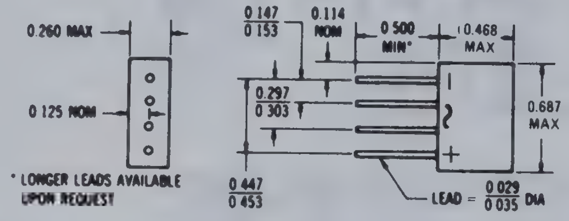


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	6.73	0.240	0.265
B	2.29	2.79	0.090	0.110
D	0.64	0.89	0.025	0.035
G	3.68	3.94	0.145	0.155
H	1.02	1.27	0.040	0.050
K	6.60	8.64	0.260	0.340
L	3.81	5.08	0.150	0.200

CASE 110

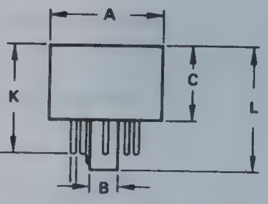

0.030
0.034
DIA
0.565 MAX
0.250
Y
R
+
~
—
Y
0.285 MAX
0.565 MAX
0.850 MIN

CASE 111

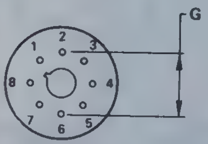


* LONGER LEADS AVAILABLE
UPON REQUEST

CASE 112-03

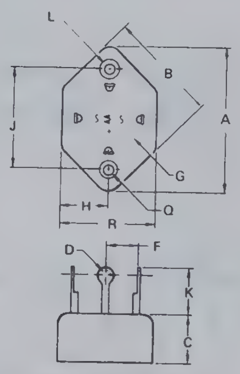


STYLE 1:
PIN 1. +
2. OPEN
3. AC
4. OPEN
5. –
6. OPEN
7. AC
8. OPEN
COLOR CODED



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	–	32.13	–	1.265
B	7.75	8.00	0.305	0.315
C	20.32	21.72	0.800	0.855
G	17.32	17.58	0.682	0.692
K	31.27	32.89	1.231	1.295
L	34.24	35.31	1.348	1.390

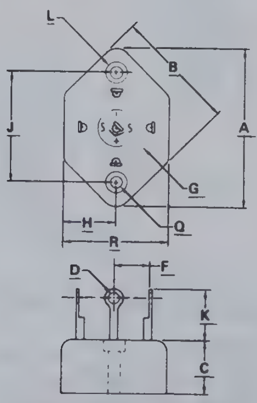
CASE 113-01



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	–	47.88	–	1.885
B	36.32	36.83	1.430	1.450
C	15.88	16.51	0.625	0.650
D	3.56	–	0.140	–
F	9.53	10.80	0.375	0.425
G	20.65 BSC		0.813 BSC	
H	15.88	16.26	0.625	0.640
J	33.32 BSC		1.312 BSC	
K	6.35	–	0.250	–
L	6.22	6.48	0.245	0.255
Q	3.30	3.81	0.130	0.150
R	31.75	32.51	1.250	1.280

NOTES:
1. DIM "L" IS 3.18 mm (0.125) DEEP;
DIM "Q" IS THRU HOLE.

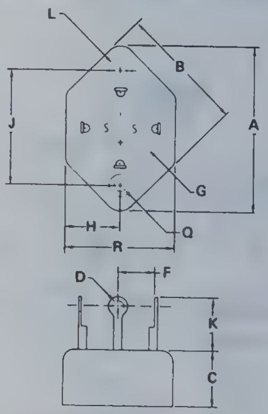
CASE 114-01



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	–	57.66	–	2.270
B	43.18	44.45	1.700	1.750
C	21.08	22.10	0.830	0.870
D	3.56	–	0.140	–
F	13.84	14.48	0.545	0.570
G	28.58 BSC		1.125 BSC	
H	–	22.10	–	0.870
J	43.94 BSC		1.730 BSC	
K	5.08	–	0.200	–
L	6.22	6.48	0.245	0.255
Q	3.30	3.81	0.130	0.150
R	–	44.20	–	1.740

NOTES:
1. DIM "L" IS 3.18 mm (0.125) DEEP;
DIM "Q" IS THRU HOLE

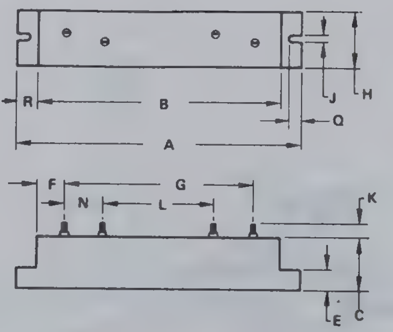
CASE 115-01



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	–	57.66	–	2.270
B	43.18	44.45	1.700	1.750
C	21.08	22.10	0.830	0.870
D	3.56	–	0.140	–
F	13.84	14.48	0.545	0.570
G	28.58 BSC		1.125 BSC	
H	–	22.10	–	0.870
J	43.94 BSC		1.730 BSC	
K	6.35	–	0.250	–
L	6.22	6.48	0.245	0.255
Q	3.30	3.81	0.135	0.150
R	–	44.20	–	1.740

NOTES:
1. DIM "L" IS 3.18 mm (0.125) DEEP;
DIM "Q" IS THRU HOLE.

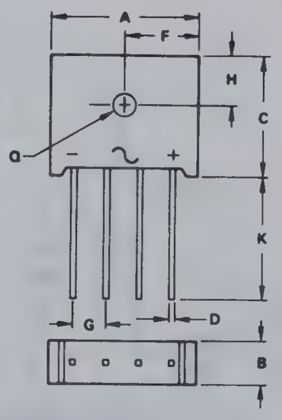
CASE 116-02



NOTES:
1. TERMINALS HAVE MILLED SLOTS 1.17 mm (0.046) WIDE AND 4.37 mm (0.172) DEEP.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	176.28	177.80	6.940	7.000
B	150.88	152.40	5.940	6.000
C	28.96	34.29	1.140	1.350
E	10.67	12.70	0.420	0.500
F	14.61	15.88	0.575	0.625
G	116.84	121.92	4.600	4.800
H	32.26	34.29	1.270	1.350
J	3.66 NOM		0.144 NOM	
K	7.11	8.13	0.280	0.320
L	66.04	68.58	2.600	2.700
N	25.40	26.67	1.000	1.050
Q	8.89	9.40	0.350	0.370
R	11.68	12.70	0.460	0.500

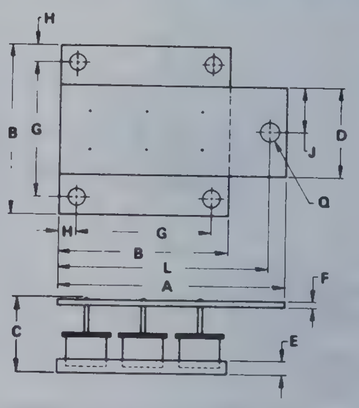
CASE 117



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	22.35	23.37	0.880	0.920
B	6.10	7.11	0.240	0.280
C	18.16	19.18	0.715	0.755
D	0.89	1.14	0.035	0.045
F	11.18	11.68	0.440	0.460
G	4.57	5.59	0.180	0.220
H	7.24	7.75	0.285	0.305
K	19.05	–	0.750	–
Q	3.43	3.94	0.135	0.155

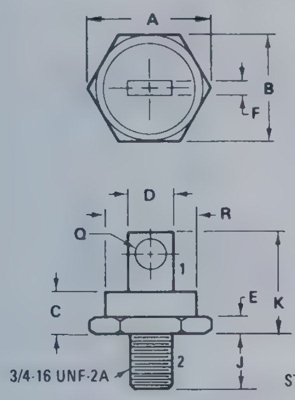
NOTE.
1. TERMINAL SYMBOLS MOLDED INTO CASE.
2. LEADS ARE SQUARE & CENTERED ON PACKAGE.

CASE 119-01



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	50.29	51.31	1.980	2.020
B	37.59	38.61	1.480	1.520
C	–	16.51	–	0.650
D	20.24	21.01	0.797	0.827
E	2.92	3.43	0.115	0.135
F	1.32	1.83	0.052	0.072
G	29.97	30.99	1.180	1.220
H	3.56	4.06	0.140	0.160
J	10.06	10.57	0.396	0.416
L	46.74	47.74	1.840	1.860
Q	3.30	3.81	0.130	0.150

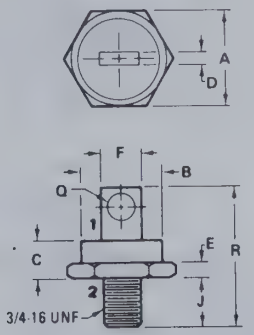
CASE 126-01



STYLE 1:
TERM. 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	51.08	51.59	2.011	2.031
B	44.32	44.58	1.745	1.755
C	–	27.94	–	1.100
D	18.80	19.30	0.740	0.760
E	9.40	9.91	0.370	0.390
F	6.10	6.60	0.240	0.260
J	20.32	25.65	0.800	1.010
K	–	50.55	–	1.990
Q	9.27	9.78	0.365	0.385
R	–	43.69	–	1.720

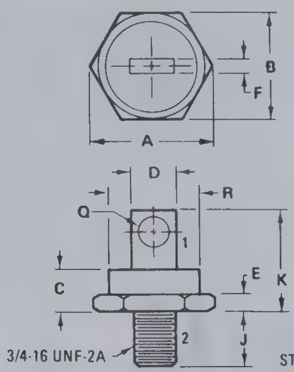
CASE 127



PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	50.42	51.18	1.985	2.015
B	-	49.28	–	1.940
C		27.94		1.100
D	5.84	6.86	.230	.270
E	9.14	9.91	.360	.390
F	-	27.94	–	1.100
J	25.02	25.78	.985	1.015
Q	14.02	14.53	.552	.572
R	–	88.90	–	3.500

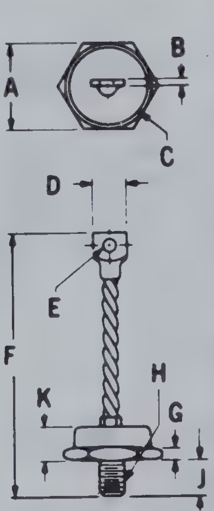
CASE 128-01



STYLE 1:
TERM. 1. CATHODE
2. ANODE

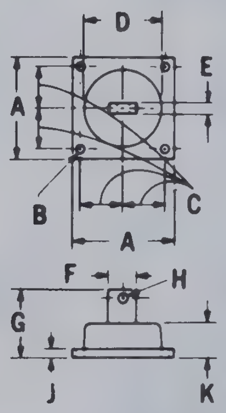
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	65.79	66.29	2.590	2.610
B	57.02	57.28	2.245	2.255
C	–	27.94	–	1.100
D	25.15	27.94	0.990	1.100
E	9.40	9.65	0.370	0.380
F	7.67	8.18	0.302	0.322
J	25.15	25.65	0.990	1.010
K	–	68.83	–	2.710
Q	14.02	14.53	0.552	0.572
R	–	55.88	–	2.200

CASE 130
CASE 131
CASE 132



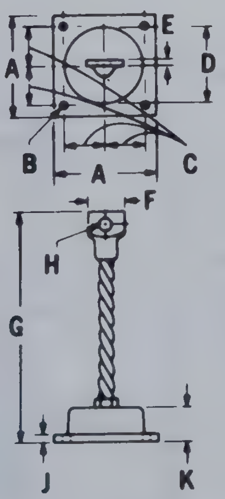
DIMENSION	CASE 130	CASE 131	CASE 132
A (hex)	1.75	2.00	2.250
B (max)	0.155	0.200	0.260
C (max dia)	1.72	1.94	2.20
D (max)	0.64	1.00	1.155
E (dia)	0.343	0.531	0.562
F (max)	8.10	8.10	8.10
G (typ)	0.375	0.375	0.375
H (thread)	¾-16 UNF	¾-16 UNF	¾-16 UNF
J (max)	1.00	1.00	1.00
K (max)	1.10	1.10	1.10

CASE 133
CASE 134
CASE 135
CASE 136



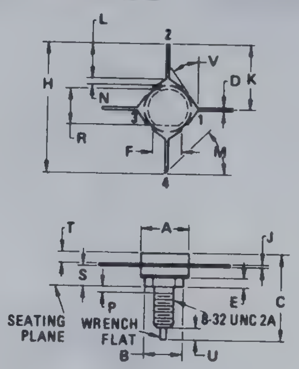
DIMENSION	CASE 133	CASE 134	CASE 135	CASE 136
A (typ)	2.25	3.00	3.00	3.25
B (dia)	0.203	0.281	0.281	0.281
C (max)	0.880	1.255	1.255	1.380
D (max dia)	1.720	2.100	2.200	2.885
E (max)	0.260	0.260	0.320	0.500
F (max)	0.760	1.100	1.100	1.30
G (max)	1.9	2.50	2.70	2.50
H (dia)	0.375	0.562	0.562	0.562
J (max)	0.260	0.260	0.260	0.260
K (max)	1.00	1.00	1.00	1.00

CASE 137
CASE 138
CASE 139



DIMENSION	CASE 137	CASE 138	CASE 139
A (typ)	2.25	3.00	3.00
B (dia)	0.203	0.281	0.281
C (max)	0.880	1.255	1.255
D (max dia)	1.720	2.100	2.20
E (max)	0.155	0.200	0.260
F (max)	0.64	1.00	1.155
G (max)	7.10	6.90	6.90
H (dia)	0.343	0.531	0.562
J (max)	0.260	0.260	0.260
K (max)	1.00	1.00	1.00

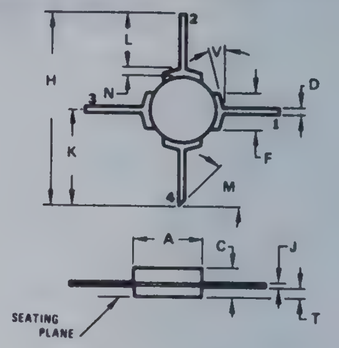
CASE 144B-03


L
2
V
H
D
K
N
3
1
R
F
M
4
T
A
J
S
P
E
C
SEATING PLANE
WRENCH FLAT
8-32 UNC 2A
B
U

STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	17.63	19.46	0.694	0.766
D	0.64	0.89	0.025	0.035
E	1.78	2.03	0.070	0.080
F	5.59	5.84	0.220	0.230
H	26.16	27.69	1.030	1.090
J	0.10	0.15	0.004	0.006
K	13.08	13.84	0.515	0.545
L	7.11	7.37	0.280	0.290
M	40°	50°	40°	50°
N	1.27	1.52	0.050	0.060
P		1.27		0.050
R	7.59	7.80	0.299	0.307
S	4.01	4.52	0.158	0.178
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130
V	10°	20°	10°	20°

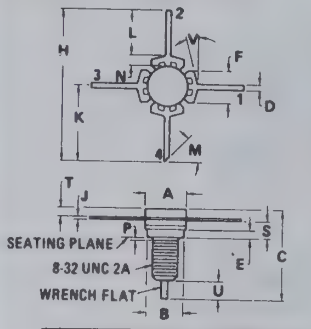
CASE 144C-02


2
L
V
H
3
N
D
1
F
K
4
M
A
C
J
SEATING PLANE
T

STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	9.78	0.370	0.385
C	4.06	4.32	0.160	0.170
D	0.64	0.89	0.025	0.035
F	5.59	5.84	0.220	0.230
H	26.67	27.18	1.050	1.070
J	0.10	0.15	0.004	0.006
K	13.34	13.59	0.525	0.535
L	7.11	7.37	0.280	0.290
M	40°	50°	40°	50°
N	1.27	1.52	0.050	0.060
T	1.65	1.91	0.065	0.075
V	10°	20°	10°	20°

CASE 144D-04

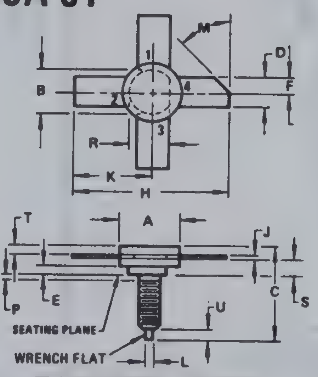

2
H
L
V
F
3
N
1
D
K
4
M
T
J
A
SEATING PLANE
P
S
8-32 UNC 2A
E
C
WRENCH FLAT
U
B

STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.06	7.26	0.278	0.286
B	6.25	6.45	0.246	0.254
C	15.49	16.51	0.610	0.650
D	0.64	0.89	0.025	0.035
E	1.40	1.65	0.055	0.065
F	5.59	5.84	0.220	0.230
H	26.67	27.18	1.050	1.070
J	0.10	0.15	0.004	0.006
K	13.34	13.59	0.525	0.535
L	8.26	8.51	0.325	0.335
M	40°	50°	40°	50°
N	1.40	1.65	0.055	0.065
P	–	1.27	–	0.050
S	3.00	3.25	0.118	0.128
T	1.40	1.65	0.055	0.065
U	2.92	3.68	0.115	0.145
V	10°	20°	10°	20°

CASE 145A-01


M
1
D
B
2
4
F
R
3
K
H
T
A
J
P
E
C
S
U
SEATING PLANE
WRENCH FLAT
L

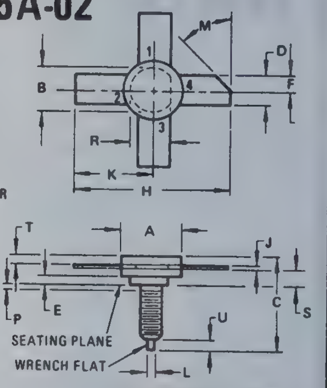
STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

NOTE:
CASE 145A-01
USE 8-32NC2A
STUD

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	18.03	19.05	0.710	0.750
D	5.59	5.84	0.220	0.230
E	1.78	2.03	0.070	0.080
F	2.79	2.92	0.110	0.115
H	26.42	28.70	1.040	1.130
J	0.10	0.15	0.004	0.006
K	13.21	14.35	0.520	0.565
L	1.40	1.65	0.055	0.065
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
R	7.59	7.80	0.299	0.307
S	4.01	4.52	0.158	0.178
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130

CASE 145A-02

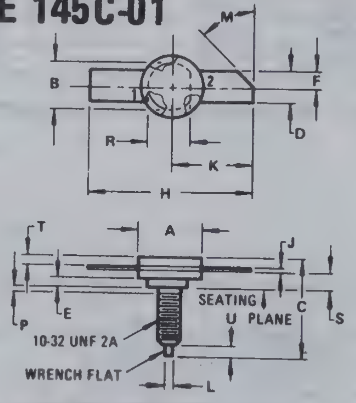
STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR


M
1
D
B
2
4
F
R
3
K
H
T
A
J
P
E
C
S
U
SEATING PLANE
WRENCH FLAT
L

NOTE: 145A-02 USES
10-32NF2A STUD.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.57	12.90	0.459	0.508
B	10.54	10.80	0.415	0.425
C	21.21	21.46	0.835	0.845
D	5.59	5.84	0.220	0.230
E	1.83	1.98	0.072	0.078
F	2.79	2.92	0.110	0.115
H	26.42	28.70	1.040	1.130
J	0.10	0.15	0.004	0.006
K	13.21	14.35	0.520	0.565
L	1.65	1.90	0.065	0.075
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
R	9.78	10.01	0.385	0.394
S	3.89	4.45	0.153	0.175
T	2.03	2.29	0.080	0.090
U	2.54	3.30	0.100	0.130

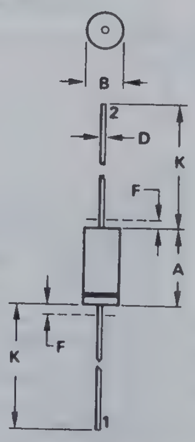
CASE 145C-01


M
B
1
2
F
R
D
K
H
T
A
J
P
E
10-32 UNF 2A
SEATING PLANE
U
C
S
WRENCH FLAT
L

STYLE 1:
PIN 1. BASE
2. COLLECTOR
STUD-EMITTER

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.45	12.95	0.490	0.510
B	10.41	10.92	0.410	0.430
C	21.21	21.46	0.835	0.845
D	8.51	8.76	0.335	0.345
E	1.78	2.03	0.070	0.080
F	4.19	4.45	0.165	0.175
H	22.86	23.62	0.900	0.930
J	0.10	0.15	0.004	0.006
K	11.43	11.81	0.450	0.465
L	1.65	1.91	0.065	0.075
M	40°	50°	40°	50°
P	–	1.27	–	0.050
R	9.78	10.03	0.385	0.395
S	4.11	4.42	0.162	0.174
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130

CASE 146 DO-14

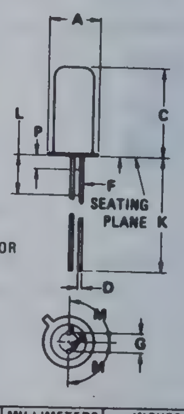


STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.84	7.62	0.230	0.300
B	2.74	3.56	0.108	0.140
D	0.46	0.56	0.018	0.022
F	–	1.27	–	0.050
K	25.40	–	1.000	–

All JEDEC dimensions and notes apply.

CASE 149-02 (TO-1)

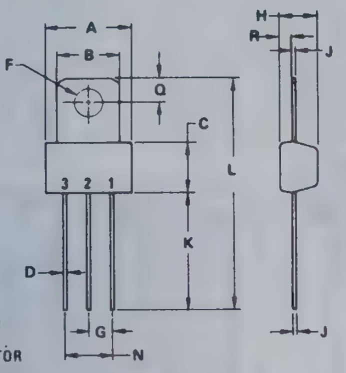

A
C
L
P
F
SEATING PLANE
K
D
M
G
M

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	6.10	–	0.240
C	–	10.41	–	0.410
D	–	0.53	–	0.021
F	0.406	0.483	0.016	0.019
G	1.55	2.06	0.061	0.081
K	38.10	–	1.500	–
L	6.35	–	0.250	–
M	90° NOM		90° NOM	
P	–	1.27	–	0.050

All JEDEC notes and dimensions apply.

CASE 152

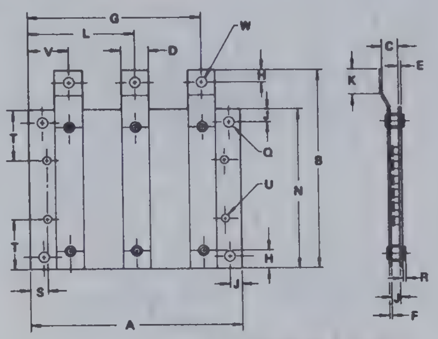

A
B
F
Q
C
L
K
3 2 1
D
G
N
H
R
J
J

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.14	9.53	0.360	0.375
B	6.60	7.24	0.260	0.285
C	5.41	5.66	0.213	0.223
D	0.38	0.53	0.015	0.021
F	3.18	3.33	0.125	0.131
G	2.54 BSC		0.100 BSC	
H	3.94	4.19	0.155	0.165
J	0.36	0.41	0.014	0.016
K	12.07	12.70	0.475	0.500
L	25.02	25.53	0.985	1.005
N	5.08 BSC		0.200 BSC	
Q	2.39	2.69	0.094	0.106
R	1.14	1.40	0.045	0.055

(See page 9-39 for lead form availability.)

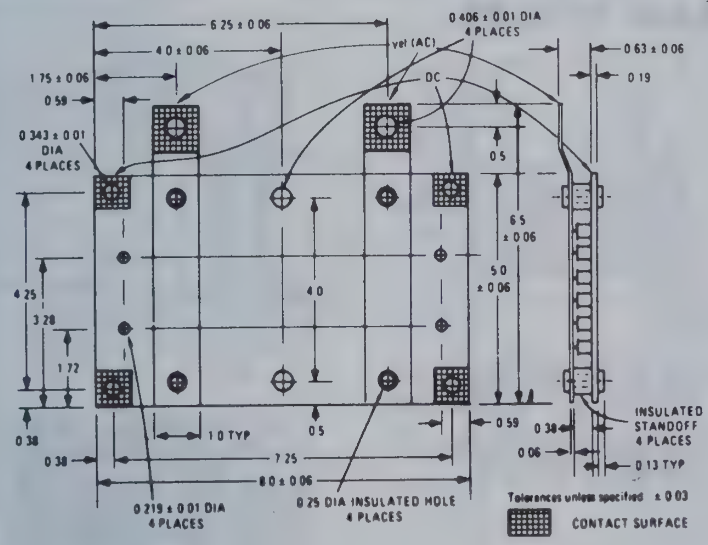
CASE 154-01

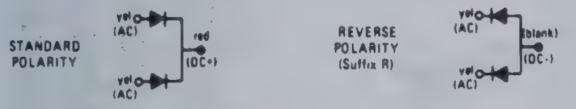

G
L
W
V
D
H
T
Q
B
U
N
T
H
S
J
A
C
K
E
R
J
F

NOTE
1. WT ≈ 454 GR.
(16 oz.)

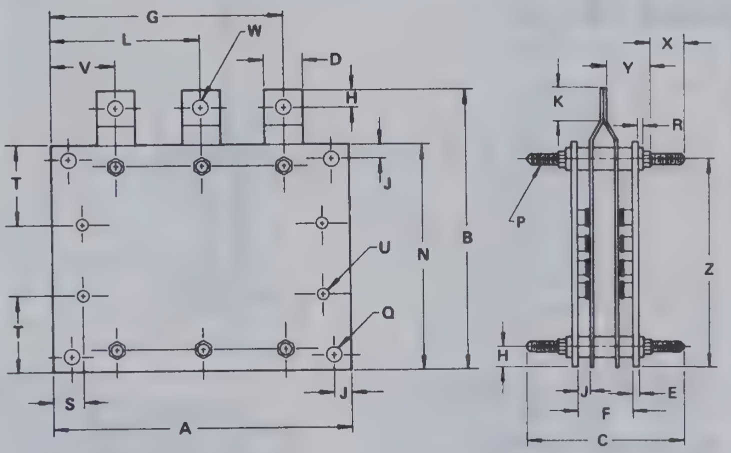
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	210.68	204.72	7.940	8 060
B	163.58	166.62	6.440	6 560
C	14.48	17.53	0.570	0.690
D	24.89	25.91	0.980	1.020
E	4.32	5.08	0.170	0.200
F	1 32	1.83	0.052	0.072
G	157 23	160.27	6.190	6.310
H	11 94	13.46	0.470	0.530
J	9.14	9 91	0 360	0.390
K	24.89	25.91	0 980	1.020
L	100 08	103 12	3.940	4.060
N	125.48	128.52	4 940	5.060
P	6.35	6.86	0.250	0.270
Q	8.33	9.09	0.328	0.358
R	2.92	3 68	0.115	0.145
S	14.22	15 75	0.560	0 620
T	42.93	44.45	1.690	1.750
U	5.18	5.94	0.204	0.234
V	42 93	45.97	1.690	1.810
W	9.93	10.69	0.391	0.421

CASE 154A


6 25 ± 0 06
4 0 ± 0 06
0 406 ± 0 01 DIA
4 PLACES
yel (AC)
DC
0 63 ± 0 06
0 19
1 75 ± 0 06
0 59
0 343 ± 0 01
DIA
4 PLACES
0 5
6 5
± 0 06
5 0
± 0 06
4 0
4 25
3 28
1 72
0 38
0 38
1 0 TYP
0 5
7 25
8 0 ± 0 06
0 59
0 38
0 06
0 13 TYP
INSULATED
STANDOFF
4 PLACES
0 219 ± 0 01 DIA
4 PLACES
0 25 DIA INSULATED HOLE
4 PLACES
Tolerances unless specified ± 0 03
CONTACT SURFACE


STANDARD
POLARITY
yel
(AC)
red
(DC+)
yel
(AC)
REVERSE
POLARITY
(Suffix R)
yel
(AC)
(blank)
(DC-)
yel
(AC)

CASE 155-01


G
L
W
V
D
H
T
J
B
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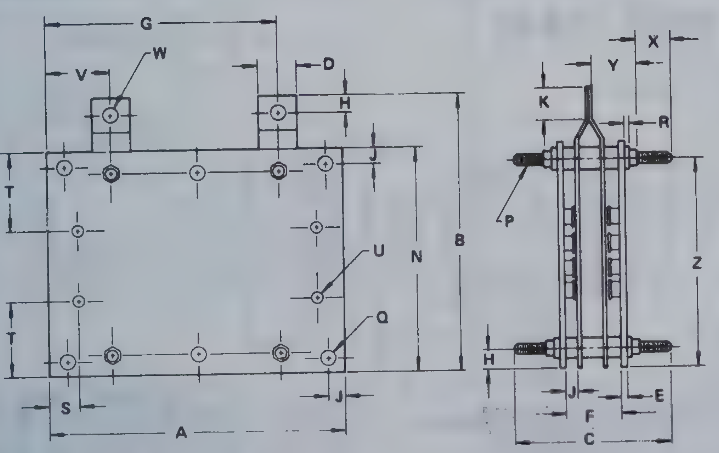
Q
S
J
A
X
Y
K
R
P
Z
H
J
F
E
C

NOTE:
1. WT ≈ 1.02 Kg
(2 lb.,4 oz.)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	201.67	204.72	7.940	8.060
B	163.57	166.62	6.440	6.560
C	94.49	96.01	3.720	3.780
D	24.89	25.91	0.980	1.020
E	4.32	5.08	0.170	0.200
F	30.99	32.51	1.220	1.280
G	157.23	160.27	6.190	6.310
H	11.94	13.46	0.470	0.530
J	9.14	9.91	0.360	0.390
K	24.89	25.91	0.980	1.020
L	100.08	103.12	3.940	4.060
N	126.24	127.76	4.970	5.030
P	1/4-2 UNC-2A			
Q	8.33	9.09	0.328	0.358
R	2.92	3.68	0.115	0.145
S	14.22	17.02	0.560	0.670
T	42.93	44.45	1.690	1.750
U	5.18	5.94	0.204	0.234
V	42.93	45.97	1.690	1.810
W	9.93	10.70	0.391	0.421
X	15.24	16.76	0.600	0.660
Y	30.99	32.51	1.220	1.280
Z	113.54	115.06	4.470	4.530

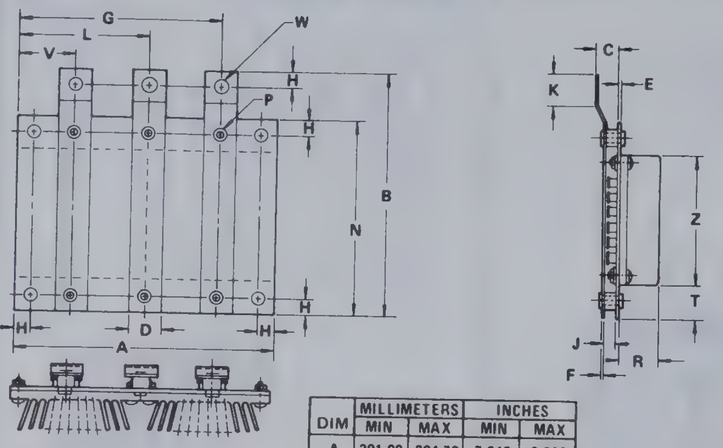
CASE 155A-01


G
W
V
D
H
J
T
U
N
B
T
Q
S
J
A
X
Y
K
R
P
Z
H
J
E
F
C

NOTE:
1. WT ≈ 0.87 Kg
(1 lb, 15 oz.)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	201.67	204.72	7.940	8.060
B	163.57	166.62	6.440	6.560
C	94.49	96.01	3.720	3.780
D	24.89	25.91	0.980	1.020
E	4.32	5.08	0.170	0.200
F	30.99	32.51	1.220	1.280
G	157.23	160.27	6.190	6.310
H	11.94	13.46	0.470	0.530
J	9.14	9.91	0.360	0.390
K	24.89	25.91	0.980	1.020
N	126.24	127.76	4.970	5.030
P	1/4-20 UNC-2A			
Q	8.33	9.09	0.328	0.358
R	2.92	3.68	0.115	0.145
S	14.22	17.02	0.560	0.670
T	42.93	44.45	1.690	1.750
U	5.18	5.94	0.204	0.234
V	42.93	45.97	1.690	1.810
W	9.93	10.69	0.391	0.421
X	15.24	16.76	0.600	0.660
Y	30.99	32.51	1.220	1.280
Z	113.54	115.06	4.470	4.530

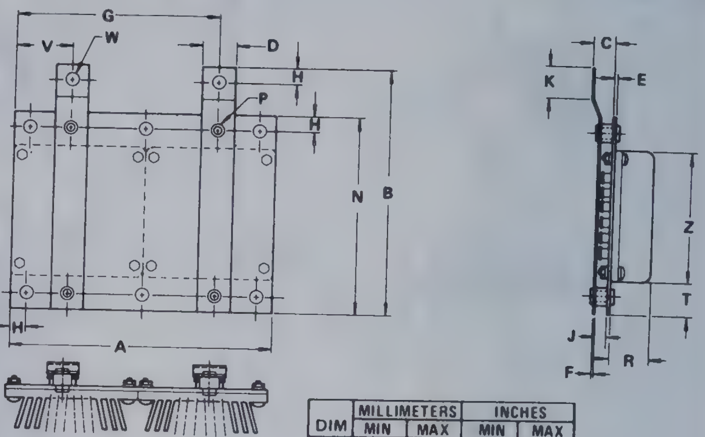
CASE 156-01


G
L
V
W
H
P
H
B
N
Z
T
C
K
E
J
F
R
H
D
H
A

NOTE:
1. WT ≈ 1.56 Kg
(3 lb., 7 oz.)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	201.68	204.72	7.940	8.060
B	188.98	192.02	7.440	7.560
C	14.48	17.53	0.570	0.690
D	24.89	25.91	0.980	1.020
E	2.79	3.56	0.110	0.140
F	1.32	1.83	0.052	0.072
G	157.23	160.27	6.190	6.310
H	11.94	13.46	0.470	0.530
J	9.14	9.91	0.360	0.390
K	24.89	25.91	0.980	1.020
L	100.08	103.12	3.940	4.060
N	150.88	153.92	5.940	6.060
P	6.35	6.86	0.250	0.270
R	29.39	30.96	1.157	1.219
T	24.89	25.91	0.980	1.020
Y	42.93	45.97	1.690	1.810
W	10.06	10.57	0.396	0.416
Z	100.08	103.12	3.940	4.060

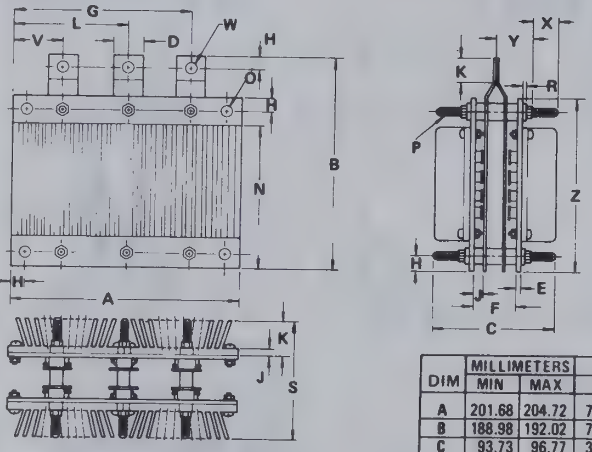
CASE 156A-01


G
V
W
D
H
P
H
N
B
Z
T
C
K
E
J
F
R
H
A

NOTE:
1. WT ≈ 1.5 kg
(3 lb. 4 oz.)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	201.68	204.72	7.940	8.060
B	188.98	192.02	7.440	7.560
C	14.48	17.53	0.570	0.690
D	24.89	25.91	0.980	1.020
E	2.79	3.56	0.110	0.140
F	1.32	1.83	0.052	0.072
G	157.23	160.27	6.190	6.310
H	11.94	13.46	0.470	0.530
J	9.14	9.91	0.360	0.390
K	24.89	25.91	0.980	1.020
N	150.88	153.92	5.940	6.060
P	6.35	6.86	0.250	0.220
R	29.39	30.96	1.157	1.219
T	24.89	25.91	0.980	1.020
V	42.93	45.97	1.690	1.810
W	10.06	10.57	0.396	0.416
Z	100.08	103.12	3.940	4.060

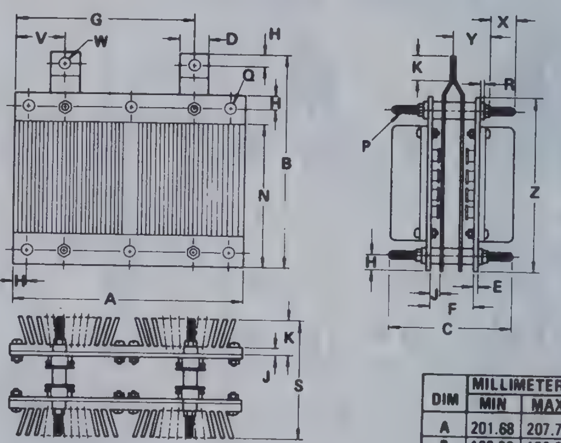
CASE 157-01


G
L
V
D
W
H
Q
H
B
N
H
A
K
J
S
X
Y
K
R
P
Z
H
J
E
F
C

NOTE:
1. WT ≈ 2.8 k grams
(6 lb, 1 oz.)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	201.68	204.72	7.940	8.060
B	188.98	192.02	7.440	7.560
C	93.73	96.77	3.690	3.810
D	24.89	25.91	0.980	1.020
E	2.79	3.56	0.110	0.140
F	30.23	33.27	1.190	1.310
G	157.23	160.27	6.190	6.310
H	11.94	13.46	0.470	0.530
J	9.14	9.91	0.360	0.390
K	24.89	25.91	0.980	1.020
L	100.08	103.12	3.940	4.060
N	125.48	128.52	4.940	5.060
P	1/4-20 UNC-2A			
Q	9.93	10.69	0.391	0.421
R	4.45	5.21	0.175	0.205
S	97.03	100.08	3.820	3.940
V	42.93	45.97	1.690	1.810
W	9.93	10.69	0.391	0.421
X	16.76	18.29	0.660	0.720
Y	29.46	30.99	1.160	1.220
Z	150.87	153.92	5.940	6.060

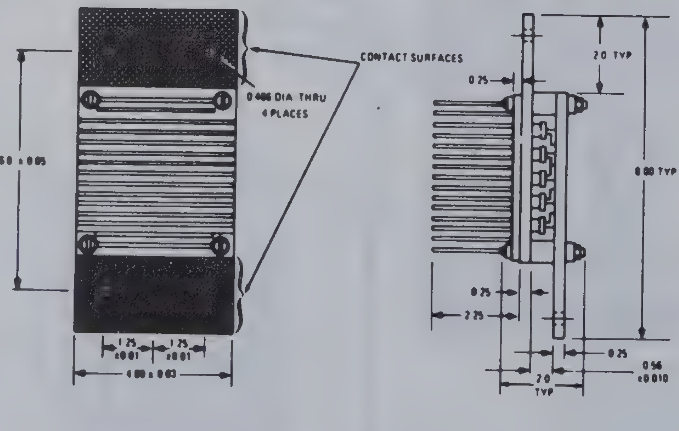
CASE 157A-01


G
V
W
D
H
Q
H
B
N
H
A
K
J
S
X
Y
K
R
P
Z
H
J
E
F
C

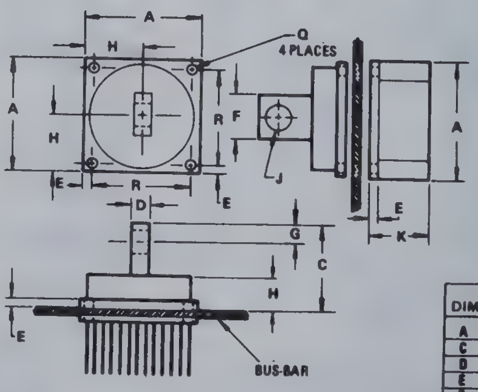
NOTE:
1. WT ≈ 2.6 Kgrams
(5 lb., 12 oz.)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	201.68	207.72	7.940	8.060
B	188.98	192.02	7.440	7.560
C	93.73	96.77	3.690	3.810
D	24.89	25.91	0.980	1.020
E	2.79	3.56	0.110	0.140
F	30.23	33.27	1.190	1.310
G	157.23	160.27	6.190	6.310
H	11.94	13.46	0.470	0.530
J	9.14	9.91	0.360	0.390
K	24.89	25.91	0.980	1.020
N	125.48	128.52	4.940	5.060
P	1/4-20 UNC-2A			
Q	9.93	10.69	0.391	0.421
R	4.45	5.21	0.175	0.205
S	97.03	100.08	3.820	3.940
V	42.93	45.97	1.690	1.810
W	9.93	10.69	0.391	0.421
X	16.76	18.29	0.660	0.720
Y	29.46	30.99	1.160	1.220
Z	150.87	153.92	5.940	6.060

CASE 158

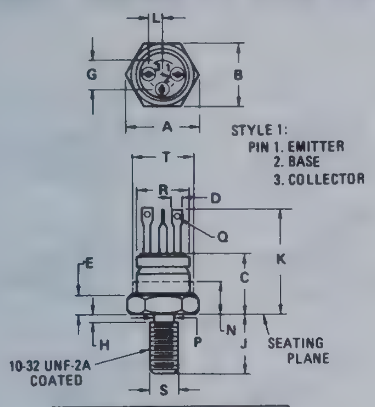

CONTACT SURFACES
0.406 DIA THRU
4 PLACES
6.0 ± 0.05
1.25 ±0.01
1.25 ±0.01
4.00 ± 0.03
2.0 TYP
0.25
8.00 TYP
0.25
2.25
0.25
0.56 ±0.010
2.0 TYP

CASE 159-02


A
Q
4 PLACES
H
A
H
R
F
E
R
E
J
A
D
E
K
G
C
H
E
BUS-BAR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	78.74	86.36	3.100	3.400
C	57.40	61.47	2.260	2.420
D	8.89	16.51	0.350	0.650
E	5.08	6.35	0.200	0.250
F	27.94	35.56	1.100	1.400
G	7.62	8.89	0.300	0.350
H	20.32	23.11	0.800	0.910
J	14.02	14.53	0.552	0.572
K	53.34	60.96	2.100	2.400
Q	6.88	7.39	0.271	0.291
R	68.58	73.66	2.700	2.900

CASE 160-03 TO-59

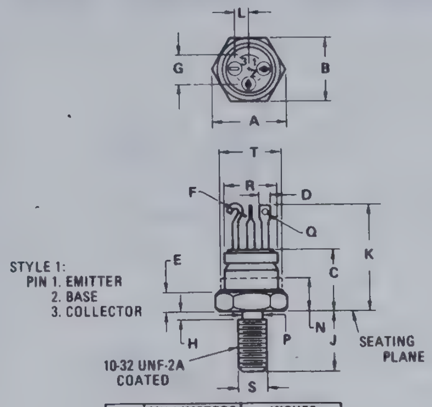


STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
B	10.77	11.10	0.424	0.437
C	8.13	11.89	0.320	0.468
E	2.29	3.81	0.090	0.150
G	4.70	5.46	0.185	0.215
H	–	1.98	–	0.078
J	10.16	11.56	0.400	0.455
K	14.48	19.38	0.570	0.763
L	2.29	2.79	0.090	0.110
N	–	6.35	–	0.250
P	4.14	4.80	0.163	0.189
Q	1.02	1.65	0.040	0.065
R	8.08	9.65	0.318	0.380
S	4.212	4.310	0.1658	0.1697
T	9.65	11.10	0.380	0.437

All JEDEC dimensions and notes apply
Collector isolated from case.

CASE 160A-03 TO-59

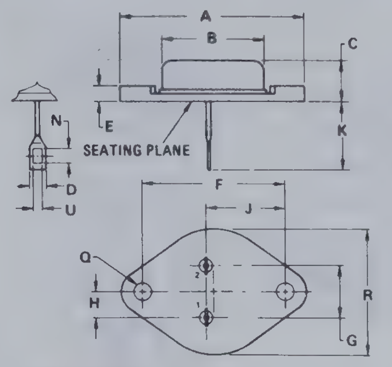


STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
B	10.77	11.10	0.424	0.437
C	8.13	11.89	0.320	0.468
E	2.29	3.81	0.090	0.150
F	1.14	1.78	0.045	0.070
G	4.70	5.46	0.185	0.215
H	–	1.98	–	0.078
J	10.16	11.56	0.400	0.455
K	14.48	19.38	0.570	0.763
L	2.29	2.79	0.090	0.110
N	–	6.35	–	0.250
P	4.14	4.80	0.163	0.189
Q	1.02	1.65	0.040	0.065
R	8.08	9.65	0.318	0.380
S	4.212	4.310	0.1658	0.1697
T	9.65	11.10	0.380	0.437

All JEDEC dimensions and notes apply

CASE 161

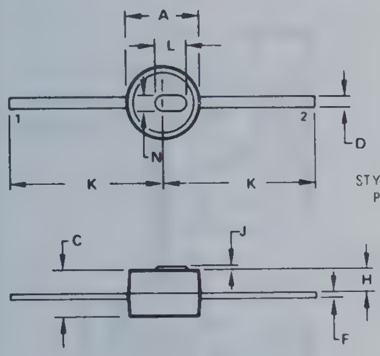


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	39.37	–	1.550
B	–	21.08	–	0.830
C	–	9.14	–	0.360
D	–	3.56	–	0.140
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	15.49	17.27	0.610	0.680
N	3.05	3.30	0.120	0.130
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050
U	1.83	–	0.072	–

STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR

NOTE:
1. LEADS ARE MASHED & PIERCED.

CASE 166-02



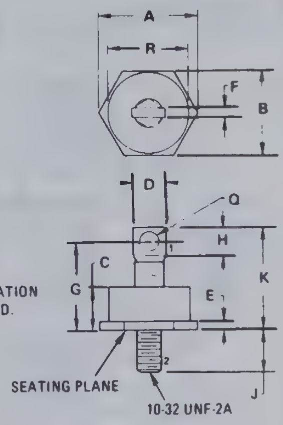
STYLE 1
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.98	2.34	0.078	0.092
C	1.22	1.47	0.048	0.058
D	0.25	0.41	0.010	0.016
F	0.10	0.15	0.004	0.006
H	0.51	0.76	0.020	0.030
J	0.03	0.08	0.001	0.003
K	4.19	4.45	0.165	0.175
L	0.89	1.14	0.035	0.045
N	0.38	0.64	0.015	0.025

Optional Package with Raised Circular Tab Available. Specify Case 166 01

CASE 167

NOTES:
1. CRIMPED LUG
2. ANGULAR ORIENTATION OF LUG UNDEFINED.



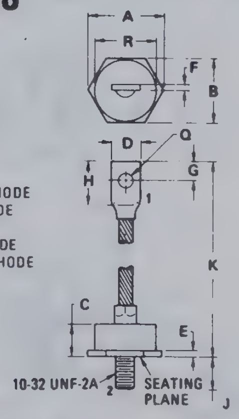
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	36.83	–	1.450
B	31.37	32.13	1.235	1.265
C	13.72	17.91	0.540	0.705
D	12.70	13.34	0.500	0.525
E	2.92	3.43	0.115	0.135
F	2.67	3.43	0.105	1.135
G	29.21	34.29	1.150	1.350
H	12.70	–	0.500	–
J	10.77	12.70	0.424	0.500
K	34.93	44.45	1.375	1.750
Q	6.10	6.60	0.240	0.260
R	–	30.48	–	1.200

STYLE 1:
PIN 1. CATHODE
2. ANODE

STYLE 2.
PIN 1. ANODE
2. CATHODE

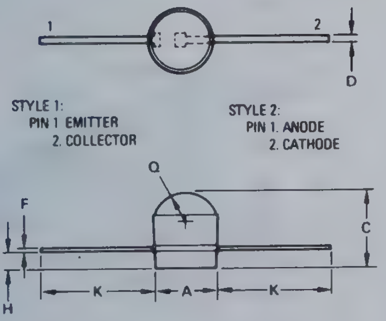
CASE 168

STYLE 1:
TERM 1. CATHODE
2. ANODE
STYLE 2:
TERM. 1. ANODE
2. CATHODE



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	36.83	–	1.450
B	31.37	32.13	1.235	1.265
C	13.72	17.91	0.540	0.705
D	13.00	15.54	0.512	0.612
E	2.92	3.43	0.115	0.135
F	1.52	3.30	0.060	0.130
G	8.71	10.34	0.343	0.407
H	19.05	–	0.750	–
J	10.77	12.70	0.424	0.500
K	127.00	146.05	5.000	5.750
Q	6.76	7.52	0.266	0.296
R	–	30.48	–	1 200

CASE 171

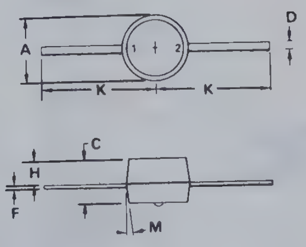


STYLE 1:
PIN 1 EMITTER
2. COLLECTOR

STYLE 2:
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.56	4.06	0.140	0.160
C	4.57	5.33	0.180	0.210
D	0.33	0.48	0.013	0.019
F	0.23	0.28	0.009	0.011
H	1.02	1.27	0.040	0.050
K	6.35	–	0.250	–
Q	1.91 NOM		0.075 NOM	

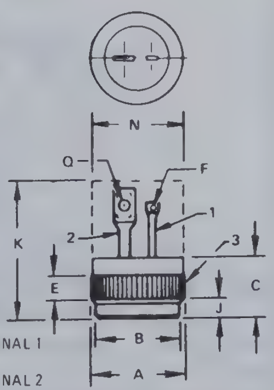
CASE 173



PIN 1. EMITTER
2. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.98	2.34	0.078	0.092
C	1.22	1.47	0.048	0.058
D	0.25	0.41	0.010	0.016
F	0.10	0.15	0.004	0.006
H	0.51	0.76	0.020	0.030
K	4.06	–	0.160	–
M	3°	7°	3°	7°

CASE 174-02 TO-203



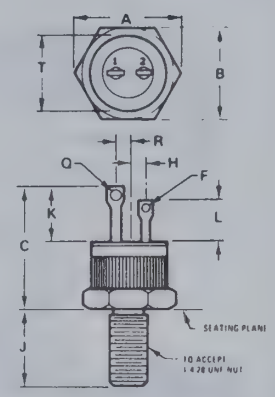
STYLE 1
TERMINAL 1. CATHODE
2. GATE
3. ANODE
STYLE 2
TERMINAL 1 ANODE
2 GATE
3. CATHODE
STYLE 3.
TERMINAL 1. MAIN TERMINAL 1
2. GATE
3 MAIN TERMINAL 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.726	12.827	0.501	0.505
B	11.811	12.065	0.465	0.475
C	8.39	9.65	0.330	0.380
E	2.54		0 100	
F	0.89	1.72	0.035	0.068
J	2.04	2.46	0.080	0.097
K	-	20 32	-	0.800
N	–	12.95	–	0.510
Q	1.66	2.28	0.065	0.090

All JEDEC dimensions and notes apply

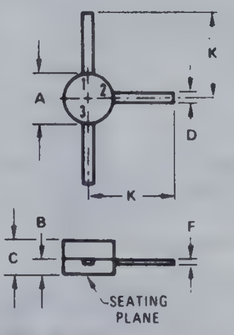
CASE 175

STYLE 1:
PIN 1. CATHODE
2. GATE
STUD. ANODE
STYLE 2:
PIN 1. ANODE
2. GATE
STUD. CATHODE
STYLE 3:
PIN 1. MAIN TERMINAL 1
2. GATE
STUD. MAIN TERMINAL 2


A
T
B
1
2
R
Q
H
F
K
L
C
J
SEATING PLANE
TO ACCEPT
1/4-28 UNF NUT

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	15.34	15.60	0.604	0.614
B	14.00	14.20	0.551	0.559
C	20.70	24.13	0.815	0.950
F	1.40	1.65	0.055	0.065
H	2.29 REF		0.090 REF	
J	10.67	11.56	0.420	0.455
K	9.78	10.54	0.385	0.415
L	6.99	7.75	0.275	0.305
Q	2.03	2.41	0.080	0.095
R	1.65 REF		0.065 REF	
T	12.70	12.83	0.500	0.505

CASE 176


K
1
2
3
A
D
K
B
C
F
SEATING PLANE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.03	2.67	0.080	0.105
B	0.51	0.76	0.020	0.030
C	1.27	2.03	0.050	0.080
D	0.25	0.41	0.010	0.016
F	0.08	0.15	0.003	0.006
K	4.06	4.57	0.160	0.180

NOTE:
A Tolerance of .25 mm (.010) must be allowed at point leads protrude from package for glass run over.

CASE 176 STYLES

STYLE 1:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 2:
PIN 1. SOURCE
2. GATE
3. DRAIN

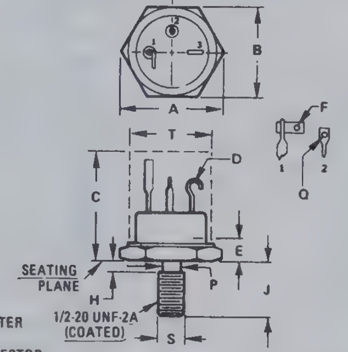
STYLE 3:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 4:
PIN 1. ANODE 2
2. ANODE 1
3. CATHODE

STYLE 5:
PIN 1. CATHODE
2. NOT CONNECTED
3. ANODE

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. ANODE

CASE 177 TO-114

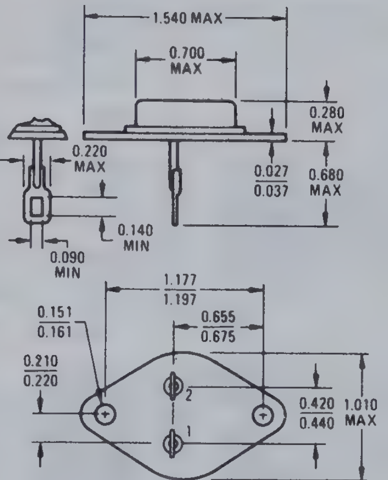

1
2
3
B
A
T
F
1
2
Q
D
C
E
SEATING PLANE
H
P
J
1/2-20 UNF-2A (COATED)
S

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	31.16	–	1.227
B	26.19	27.00	1.031	1.063
C	26.62	44.45	1.048	1.750
D	5.95	7.13	0.234	0.281
E	2.29	10.16	0.090	0.400
F	4.58	5.33	0.180	0.210
H	–	3.96	–	0.156
J	19.84	21.03	0.781	0.828
P	10.80	12.70	0.425	0.500
Q	1.99	2.76	0.078	0.109
S	11.733	11.874	0.4619	0.4675
T	22.48	26.18	0.885	1.031

All JEDEC dimensions and notes apply

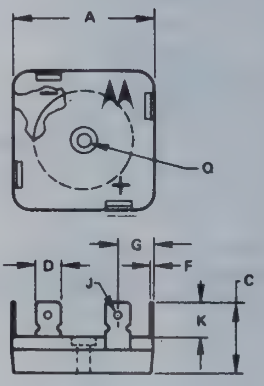
CASE 178


1.540 MAX
0.700 MAX
0.280 MAX
0.220 MAX
0.027
0.037
0.680 MAX
0.140 MIN
0.090 MIN
1.177
1.197
0.655
0.675
0.151
0.161
0.210
0.220
2
1
0.420
0.440
1.010 MAX

STYLE 1:
PIN 1. GATE
2. CATHODE
CASE. ANODE

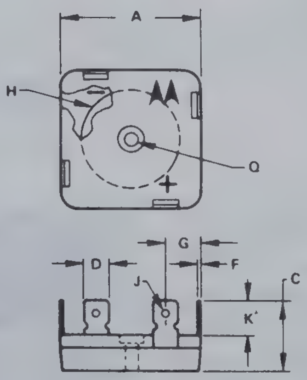
STYLE 2:
PIN 1. GATE
2. MAIN TERMINAL 1
CASE. MAIN TERMINAL 2

CASE 179-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	31.37	31.88	1.235	1.255
C	16.76	19.30	0.660	0.760
D	6.22	6.48	0.245	0.255
F	0.74	0.86	0.029	0.034
G	8.64	10.16	0.340	0.400
J	2.16	2.54	0.085	0.100
K	7.49	9.53	0.295	0.375
Q	3.56	3.94	0.140	0.155

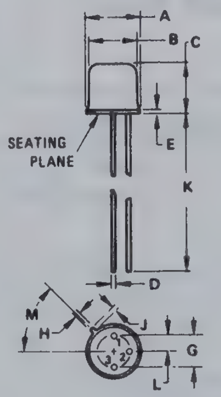
CASE 179-02



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	31.37	31.88	1.235	1.255
C	16.76	19.30	0.660	0.760
D	6.22	6.48	0.245	0.255
F	0.74	0.86	0.029	0.034
G	8.64	10.16	0.340	0.400
H	21.82	23.62	0.859	0.930
J	2.16	2.54	0.085	0.100
K	7.49	9.53	0.295	0.375
Q	3.56	3.94	0.140	0.155

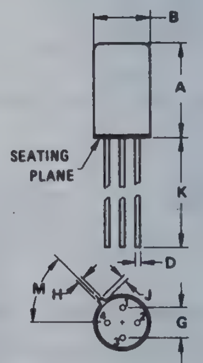
CASE 180

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR


A
B
C
SEATING PLANE
E
K
D
M
H
J
G
L

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.87	8.64	0.310	0.340
C	6.10	9.91	0.240	0.390
D	0.56	0.71	0.022	0.028
E	0.23	3.18	0.009	0.125
G	5.08 BSC		0.200 BSC	
H	0.64	0.89	0.025	0.035
J	0.74	1.14	0.029	0.045
K	38.10		1.500	
L	2.54 BSC		0.100 BSC	
M	45° BSC		45° BSC	

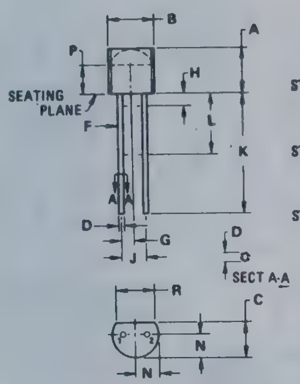
CASE 181-02


B
A
SEATING PLANE
K
D
M
H
J
G

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
4. ZENER

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	17.02	–	0.670
B	9.14	9.78	0.360	0.385
D	0.41	0.48	0.016	0.019
G	4.83	5.33	0.190	0.210
H	0.71	0.86	0.028	0.034
J	0.51	–	0.020	–
K	38.10	–	1.500	–
M	42°	48°	42°	48°

CASE 182-02



A
B
P
H
SEATING PLANE
F
L
K
A
A
D
G
J
D
C
SECT A-A
R
C
N
N

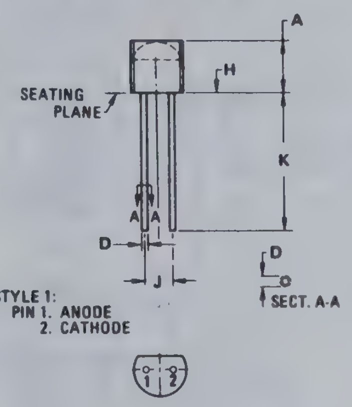
STYLE 1:
PIN 1. ANODE
2. CATHODE

STYLE 2:
PIN 1. CATHODE
2. ANODE

STYLE 3:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	5.33	0.170	0.210
B	4.45	5.21	0.175	0.205
C	3.18	4.19	0.125	0.165
D	0.356	0.533	0.014	0.021
F	0.407	0.482	0.016	0.019
G	1.27 BSC		0.050 BSC	
H	–	1.27	–	0.050
J	2.54 BSC		0.100 BSC	
K	12.70	–	0.500	–
L	6.35	–	0.250	–
N	2.03	2.66	0.080	0.105
P	2.93	–	0.115	–
R	3.43	–	0.135	–

CASE 182-03

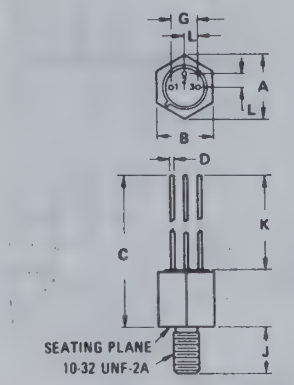


A
H
SEATING PLANE
K
A
A
D
J
D
C
SECT. A-A
1
2

STYLE 1:
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.45	4.70	0.175	0.185
D	0.41	0.48	0.016	0.019
J	2.29	2.79	0.090	0.110
K	12.70	–	0.500	–

CASE 183



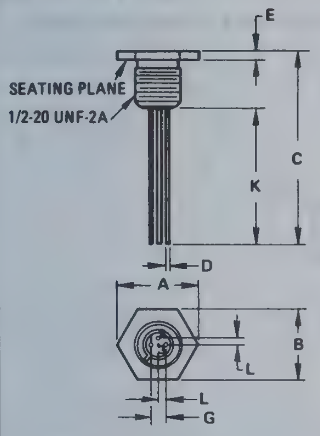
G
L
A
L
B
D
K
C
J
SEATING PLANE
10-32 UNF-2A

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

NOTE:
1. COLLECTOR CONNECTED TO CASE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.45	12.95	0.490	0.510
B	10.85	11.35	0.427	0.447
C	49.35	–	1.943	–
D	0.56	0.71	0.022	0.028
G	4.83	5.33	0.190	0.210
J	8.76	9.27	0.345	0.365
K	38.10	–	1.500	–
L	2.41	2.67	0.095	0.105

CASE 184

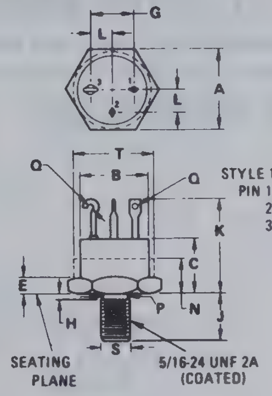


E
SEATING PLANE
1/2-20 UNF-2A
C
K
D
A
B
L
L
G

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	22.23	–	0.875
B	18.80	19.30	0.740	0.760
C	52.53	–	2.068	–
D	0.56	0.71	0.022	0.028
E	2.11	2.62	0.083	0.103
G	4.57	5.59	0.180	0.220
K	38.10	–	1.500	–
L	2.29	2.79	0.090	0.110

CASE 188 TO-63



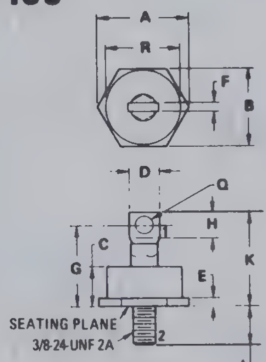
G
L
A
L
T
B
Q
Q
K
C
E
H
P
N
J
S
SEATING PLANE
5/16-24 UNF 2A (COATED)

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	21.72	22.23	0.855	0.875
B	18.92	19.69	0.745	0.775
C	12.19	13.59	0.480	0.535
E	2.29	4.24	0.090	0.167
G	12.32	13.08	0.485	0.515
H	–	2.67	–	0.105
J	11.68	12.57	0.460	0.495
K	23.80	26.16	0.937	1.030
L	6.10	6.60	0.240	0.260
N	–	7.62	–	0.300
P	7.06	7.92	0.278	0.312
Q	1.52	2.67	0.060	0.105
S	7.127	7.249	0.2806	0.2854
T	19.69	22.23	0.775	0.875

All JEDEC notes and dimensions apply.

CASE 189



A
R
F
B
D
Q
H
C
G
E
K
SEATING PLANE
3/8-24-UNF 2A
2
J

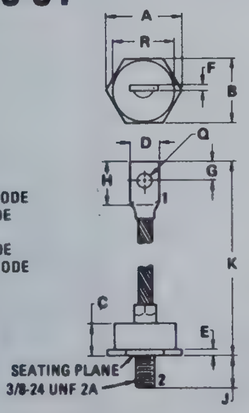
STYLE 1:
PIN 1. CATHODE
2. ANODE

STYLE 2:
PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	33.02	36.83	1.300	1.450
B	31.37	32.13	1.235	1.265
C	13.72	17.91	0.540	0.705
D	12.70	13.34	0.500	0.525
E	2.92	3.43	0.115	0.135
F	2.67	3.43	0.105	0.135
G	29.21	34.29	1.150	1.350
H	12.70	16.76	0.500	0.660
J	15.06	16.69	0.593	0.657
K	34.93	44.45	1.375	1.750
Q	6.10	6.60	0.240	0.260
R	–	30.48	–	1.200

CASE 190-01

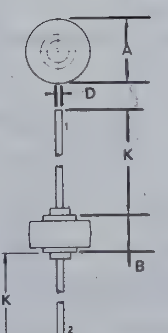
STYLE 1:
PIN 1. CATHODE
2. ANODE
STYLE 2:
PIN 1. ANODE
2. CATHODE



A
R
F
B
D
Q
G
H
1
K
C
E
SEATING PLANE
3/8-24 UNF 2A
2
J

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	36.83	–	1.450
B	31.37	32.13	1.235	1.265
C	13.72	17.91	0.540	0.705
D	13.00	15.54	0.512	0.612
E	2.92	3.43	0.115	0.135
F	1.52	3.30	0.060	0.130
G	8.71	10.34	0.343	0.407
H	19.05	22.86	0.750	0.900
J	15.06	16.69	0.593	0.657
K	127.00	139.70	5.000	5.500
Q	6.76	7.52	0.266	0.296
R	–	30.48	–	1.200

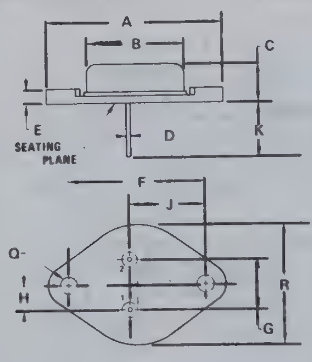
CASE 194



STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.03	10.29	0.395	0.405
B	5.94	6.25	0.234	0.246
D	1.27	1.35	0.050	0.053
K	25.15	25.65	0.990	1.010

CASE 197-01



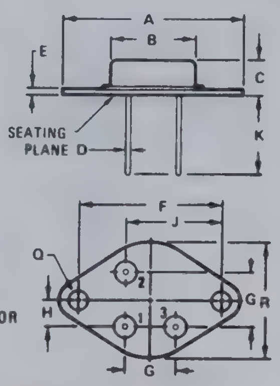
A
B
C
E
SEATING PLANE
D
K
F
J
Q
H
2
1
R
G

STYLE 1:
PIN 1. BASE
2. EMITTER
CASE. COLLECTOR

STYLE 2:
PIN 1. EMITTER
2. BASE
CASE. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	38.35	39.37	1.510	1.550
B	19.30	21.08	0.760	0.830
C	6.35	7.62	0.250	0.300
D	1.45	1.60	0.057	0.063
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.21	5.72	0.205	0.225
J	16.64	17.15	0.655	0.675
K	11.18	12.19	0.440	0.480
Q	3.84	4.09	0.151	0.161
R	24.89	26.67	0.980	1.050

CASE 198



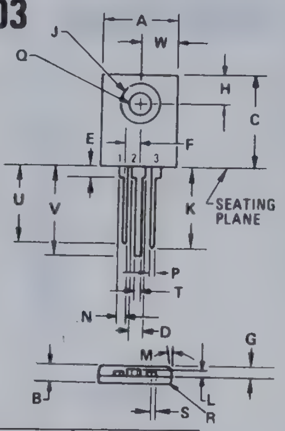
STYLE 1:
PIN 1. EMITTER
2. BASE 1
3. BASE 2

STYLE 2:
PIN 1. BASE 1
2. EMITTER
3. BASE 2
CASE - COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	31.80	–	1.252
B	11.94	12.70	0.470	0.500
C	6.35	8.64	0.250	0.340
D	0.71	0.86	0.028	0.034
E	1.27	1.91	0.050	0.075
F	24.33	24.43	0.958	0.962
G	4.83	5.33	0.190	0.210
H	2.41	2.67	0.095	0.105
J	14.48	14.99	0.570	0.590
K	9.14	10.16	0.360	0.400
Q	3.61	3.86	0.142	0.152
R	–	18.16	–	0.715

Collector connected to case

CASE 199-03

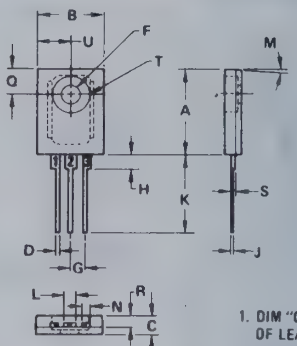


1. DIM "F" IS TO CENTERLINE OF LEADS

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.495	0.505	12.57	12.33
B	0.125	0.135	3.18	3.43
C	0.633	0.643	16.08	16.33
D	0 085	0.095	2.16	2.41
E	0.105	0.115	2.67	2.92
F	0.100 TP		2.54 TP	
G	0.075	0 085	1.91	2.16
H	0.188	0.198	4.78	5.03
J	0.275	0.285	6.99	7.24
K	0.580	0.590	14.73	14.99
L	0 032	0.034	0.813	0.864
M	3⁰ TYP		3⁰ TYP	
N	0.058	0.068	1.47	1.73
P	0.020	0.030	0.508	0.762
Q	0.142	0.152	3.61	3.86
R	0.020 TYP		0.508 TYP	
S	0.017	0.027	0.432	0.686
T	0.041	0.051	1.04	1.30
U	0.550	0.560	13.97	14.22
V	0.600	0.630	15.24	16.00
W	0.245	0.255	6.220	6.48

(See page 9-39 for lead form availability.)

CASE 199-04



1. DIM "G" IS TO CENTERLINE OF LEADS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.08	16.33	0.633	0.643
B	12.57	12.83	0.495	0.505
C	3.18	3.43	0.125	0.135
D	0.51	0.76	0.020	0.030
F	3.61	3.86	0.142	0.152
G	2.54 BSC		0.100 BSC	
H	2.67	2.92	0.105	0.115
J	0.43	0.69	0.017	0.027
K	14.73	14.99	0.580	0.590
L	2.16	2.41	0.085	0.095
M	3⁰ TYP		3⁰ TYP	
N	1.47	1.73	0.058	0.068
Q	4.78	5.03	0.188	0.198
R	1.91	2.16	0.075	0.085
S	0.81	0.86	0.032	0.034
T	6.99	7.24	0.275	0.285
U	6.22	6.48	0.245	0.255

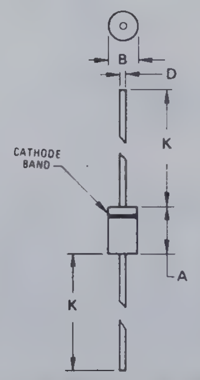
STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

STYLE 2:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 3:
PIN 1. ANODE 1
2. ANODE 2
3. GATE

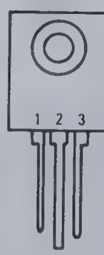
(See page 9-39 for lead form availability.)

CASE 205



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.54	3.81	0.100	0.150
B	2.34	2.64	0.092	0.104
D	0.48	0.53	0.019	0.021
K	27.51	–	1.083	–

CASE 199 STYLES

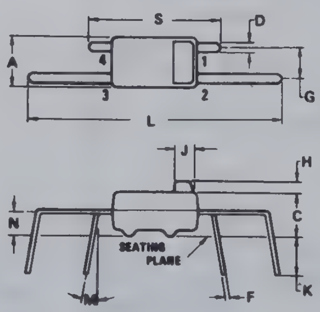


STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

STYLE 2:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 3:
PIN 1. ANODE 1
2. ANODE 2
3. GATE

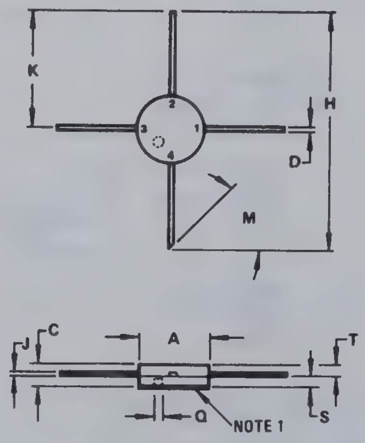
CASE 206A



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.30	3.81	0.130	0.150
C	3.43	3.94	0.135	0.155
D	0.64	0.89	0.025	0.035
F	0.20	0.30	0.008	0.012
G	1.88	2.18	0.074	0.086
H	0.64	0.89	0.025	0.035
J	1.50	1.75	0.059	0.069
K	2.92	3.18	0.115	0.125
L	15.75	16.76	0.620	0.660
M	–	10⁰	–	10⁰
N	1.78	2.03	0.070	0.080
S	8.64	9.65	0.340	0.380

PIN 1. GROUND

CASE 207A-01

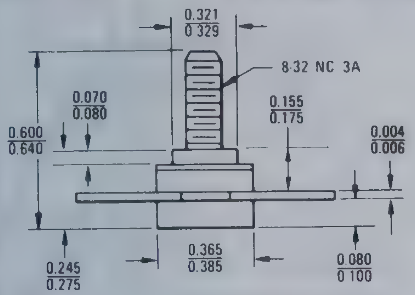


STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

NOTE:
1. BOTTOM SIDE METALLIZED PLATED

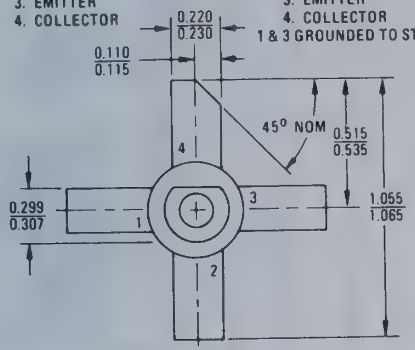
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.99	7.37	0.275	0.290
C	2.79	3.30	0.110	0.130
D	0.64	0.89	0.025	0.035
H	37.73	36.27	1.328	1.428
J	0.33	0.43	0.013	0.017
K	16.87	18.14	0.664	0.714
M	40⁰	50⁰	40⁰	50⁰
Q	0.69	0.84	0.027	0.033
S	1.40	1.65	0.055	0.065
T	1.40	1.65	0.055	0.065

CASE 208

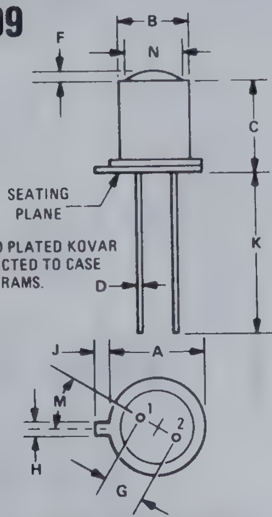

0.321
0.329
8-32 NC 3A
0.070
0.080
0.155
0.175
0.600
0.640
0.004
0.006
0.245
0.275
0.365
0.385
0.080
0.100

STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR
1 & 3 GROUNDED TO STUD


0.220
0.230
0.110
0.115
45° NOM
0.515
0.535
4
3
1
2
0.299
0.307
1.055
1.065

CASE 209

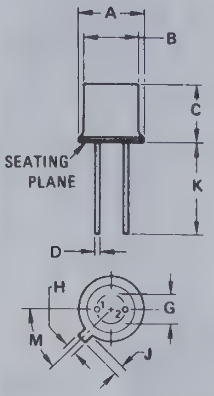

B
F
N
C
SEATING PLANE
K
D
J
A
M
1
2
H
G

NOTES:
1 - LEADS ARE GOLD PLATED KOVAR
2 - CATHODE CONNECTED TO CASE
3 - PKG. WT. ≈ 0.45 GRAMS.

PIN 1. ANODE
PIN 2. CATHODE

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.209	0.230	5.31	5.84
B	0.178	0.195	4.52	4.95
C	0.180	0.210	4.57	5.33
D	0.016	0.019	0.406	0.483
F	0.020	0.040	0.508	1.02
G	0.100 TP		2.54 TP	
H	0.039	0.046	0.991	1.17
J	0.033	0.048	0.838	1.22
K	0.500		12.7	
M	45°		45°	
N	0.132	0.158	3.35	4.01

CASE 210-01

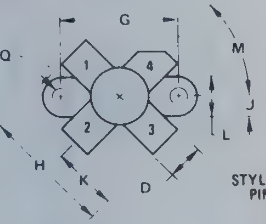

A
B
C
SEATING PLANE
K
D
H
G
M
J

STYLE 1:
PIN 1. ANODE
2. CATHODE

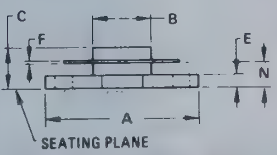
STYLE 2:
PIN 1. EMITTER
2. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.52	4.95	0.178	0.195
C	4.57	5.33	0.180	0.210
D	0.41	0.48	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.99	1.17	0.039	0.046
J	0.84	1.22	0.033	0.048
K	12.70	–	0.500	–
M	45° BSC		45° BSC	

CASE 211-01

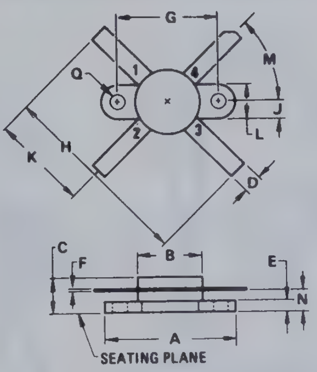

G
Q
1
4
2
3
M
J
L
H
K
D

STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR


C
F
B
E
N
A
SEATING PLANE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.64	24.89	0.970	0.980
B	9.47	9.73	0.373	0.383
C	6.07	7.14	0.239	0.281
D	5.59	5.84	0.220	0.230
E	2.16	2.67	0.085	0.105
F	0.10	0.15	0.004	0.006
G	18.29	18.54	0.720	0.730
H	21.59	22.10	0.850	0.870
J	3.12	3.23	0.123	0.127
K	10.80	11.05	0.425	0.435
L	6.22	6.48	0.245	0.255
M	40°	50°	40°	50°
N	3.81	4.57	0.150	0.180
Q	2.97	3.12	0.117	0.123

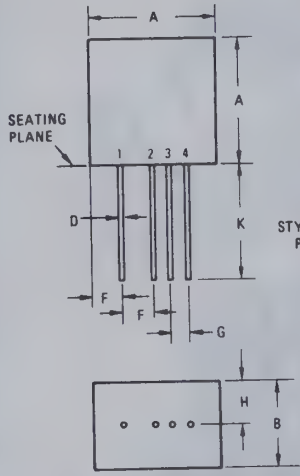
CASE 211-02


G
Q
1
4
M
J
2
3
L
K
H
D
C
F
B
E
N
A
SEATING PLANE

PIN 1. EMITTER
2 BASE
3. EMITTER
4 COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.64	24.89	0.970	0.980
B	11.81	12.07	0.465	0.475
C	5.82	6.73	0.229	0.265
D	2.16	3.94	0.085	0.155
E	2.13	2.54	0.084	0.100
F	0.10	0.15	0.004	0.006
G	18.29	18.54	0.720	0.730
H	35.56	38.10	1.400	1.500
J	3.12	3.23	0.123	0.127
K	17.78	19.05	0.700	0.750
L	6.22	6.48	0.245	0.255
M	40°	50°	40°	50°
N	3.66	4.32	0.144	0.170
Q	2.97	3.12	0.117	0.123

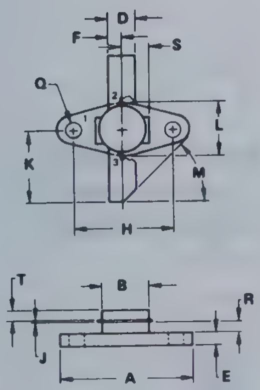
CASE 212


A
SEATING PLANE
1
2
3
4
A
D
K
F
F
G
H
B

STYLE 1:
PIN 1. ZENER
2. EMITTER
3. BASE
4. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.65	10.41	0.380	0.410
B	7.62	8.13	0.300	0.320
D	0.46	0.56	0.018	0.022
F	2.29	2.79	0.090	0.110
G	1.02	1.52	0.040	0.060
H	3.68	4.19	0.145	0.165
K	9.53	–	0.375	–

CASE 215

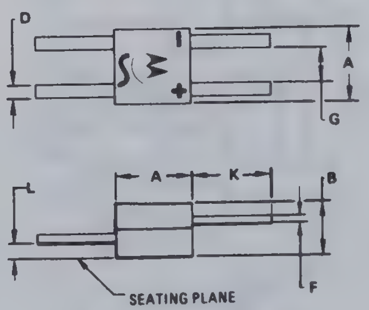

D
F
S
Q
1
2
3
L
K
M
H
T
B
R
J
A
E

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	21.08	21.59	0.830	0.850
B	9.27	9.78	0.365	0.385
D	5.59	5.84	0.220	0.230
E	2.03	2.41	0.080	0.095
F	2.79	2.92	0.110	0.115
H	15.11	15.37	0.595	0.605
J	0.10	0.15	0.004	0.006
K	13.08	13.59	0.515	0.535
L	9.91	10.41	0.390	0.410
M	45°	NOM	45°	NOM
Q	2.92	3.18	0.115	0.125
R	1.52	2.03	0.060	0.080
S	–	5.38	–	0.212
T	2.03	2.54	0.080	0.100

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

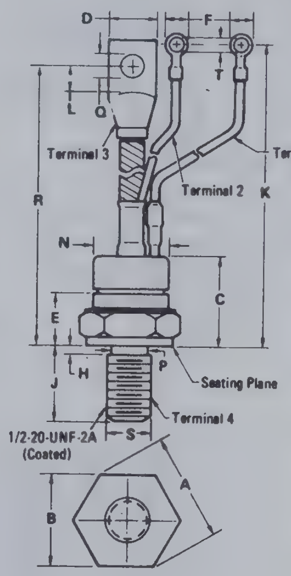
STYLE 2:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

CASE 216


D
A
G
A
K
B
L
F
SEATING PLANE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	6.73	0.240	0.265
B	4.06	4.70	0.160	0.185
D	0.89	1.27	0.035	0.050
F	0.46	0.76	0.018	0.030
G	2.84 NOM		0.112 NOM	
K	6.60	7.11	0.260	0.280
L	1.27	1.78	0.050	0.070

CASE 219 TO-94

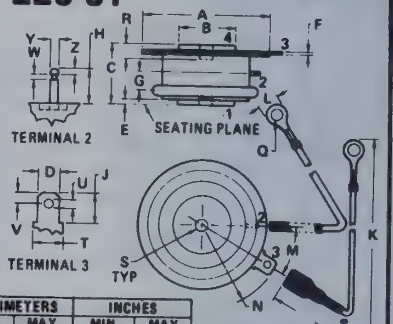

D
F
T
L
Q
Terminal 3
Terminal 1
Terminal 2
K
R
N
C
E
H
P
Seating Plane
J
Terminal 4
1/2-20-UNF-2A
(Coated)
S
A
B

STYLE 1:
TERMINAL 1. GATE
2. CATHODE
3. CATHODE
4. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	31.16	–	1.227
B	26.19	27.00	1.031	1.063
C	–	63.50	–	2.500
D	11.10	16.50	0.437	0.650
E	4.40	12.70	0.170	0.500
F	5.46	7.62	0.215	0.300
H	–	3.17	–	0.125
J	20.25	21.00	0.797	0.827
K	174.0	190.5	6.850	7.500
L	6.35	–	0.250	–
N	–	26.18	–	1.031
P	10.80	12.67	0.425	0.499
Q	6.61	7.87	0.260	0.310
R	146.7	159.1	5.775	6.265
S	11.733	11.874	0.4619	0.4675
T	3.56	3.81	0.140	0.150

All JEDEC dimensions and notes apply

CASE 220-01

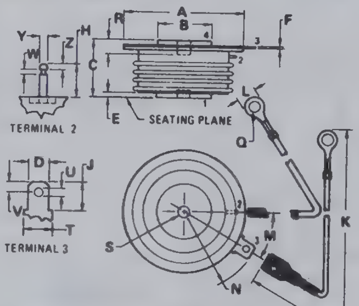

Y
W
Z
H
C
R
A
B
4
3
F
G
2
1
L
E
TERMINAL 2
SEATING PLANE
Q
D
U
J
V
T
TERMINAL 3
S
TYP
K
2
3
M
N

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	36.07	43.18	1.420	1.700
B	18.54	29.59	0.730	1.165
C	12.45	15.24	0.490	0.600
D	4.72	4.85	0.186	0.191
E	0.25	2.54	0.010	0.100
F	0.35	0.48	0.014	0.019
G	7.62	–	0.300	–
H	3.94	–	0.155	–
J	6.22	19.30	0.245	0.760
K	202.69	206.12	7.980	8.115
L	–	7.62	–	0.300
M	20⁰	50⁰	20⁰	50⁰
N	15.49	28.58	0.610	1.125
Q	3.48	3.89	0.137	0.153
R	1.27	3.18	0.050	0.125
S	3.12	3.68	0.123	0.145
T	4.72	7.92	0.186	0.312
U	1.27	1.78	0.050	0.070
V	2.92	3.56	0.115	0.140
W	0.25	0.51	0.010	0.020
Y	1.45	1.50	0.057	0.059
Z	0.89	1.40	0.035	0.055

STYLE 1:
1. ANODE
2. GATE
3. CATHODE
4. CATHODE

NOTES:
1. PACKAGE CONTOUR OPTIONAL BETWEEN TERM. 1 & 2 and BETWEEN TERM. 2 & 3 WITHIN A. TERMINALS 2 and 3 MUST BE LOCATED TO MAKE THE OUTLINE NON-SYMMETRICAL.
2. DIM "K" APPLIES TO BOTH LEADS.
3. DIMENSIONS TO DIA. OF SURFACE 1 ALSO APPLIES TO SURFACE 4.

CASE 220-02


Y
W
Z
H
C
R
A
B
4
3
F
TERMINAL 2
E
SEATING PLANE
L
Q
D
U
J
V
T
TERMINAL 3
S
K
M
N

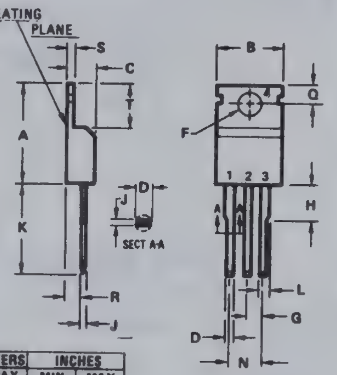
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	55.88	63.50	2.200	2.500
B	26.19	38.10	1.031	1.500
C	25.40	27.05	1.000	1.065
D	4.72	4.85	0.186	0.191
E	0.76	2.79	0.030	0.110
F	0.35	0.48	0.014	0.019
H	3.18	–	0.125	–
J	6.22	19.30	0.245	0.760
K	202.69	206.12	7.980	8.115
L	–	7.62	–	0.300
M	15⁰	50⁰	15⁰	50⁰
N	–	36.45	–	1.435
Q	3.48	3.89	0.137	0.153
R	1.27	4.06	0.050	0.160
S	3.12	3.68	0.123	0.145
T	4.72	7.92	0.186	0.312
U	1.27	1.78	0.050	0.070
V	2.92	3.56	0.115	0.140
W	0.25	0.51	0.010	0.020
Y	1.45	1.50	0.057	0.059
Z	0.64	1.65	0.025	0.064

STYLE 1:
1. ANODE
2. GATE
3. CATHODE
4. CATHODE

CASE 221-02 TO-220AB

STYLE 1:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 3:
PIN 1. CATHODE
2. ANODE
3. GATE
4. NEUTRAL


SEATING PLANE
S
C
A
K
D
J
SECT A-A
R
J
B
Q
F
1 2 3
A
H
L
G
D
N

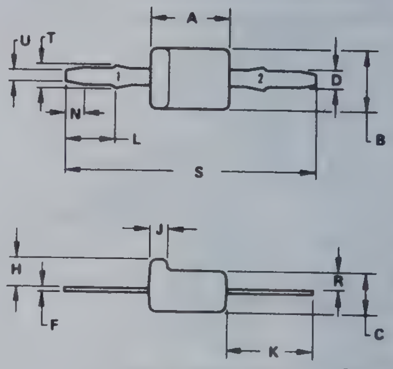
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.23	15.87	0.560	0.625
B	9.66	10.66	0.380	0.420
C	3.56	4.82	0.140	0.190
D	0.51	1.14	0.020	0.045
F	3.531	3.733	0.139	0.147
G	2.29	2.79	0.090	0.110
H	–	6.35	–	0.250
J	0.31	1.14	0.012	0.045
K	12.70	14.27	0.500	0.562
L	1.14	1.77	0.045	0.070
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.92	0.080	0.115
S	0.51	1.39	0.020	0.055
T	5.85	6.85	0.230	0.270

All JEDEC dimensions and notes apply

STYLE 2:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

STYLE 4:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. NEUTRAL

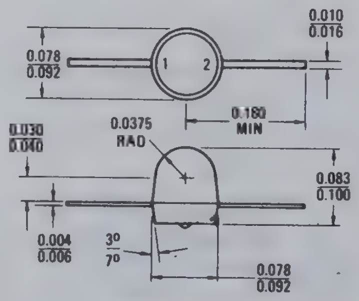
CASE 226


A
U
T
1
2
D
N
L
B
S
J
H
R
F
C
K

PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.86	4.11	0.152	0.162
B	2.92	3.18	0.115	0.125
C	1.91	2.16	0.075	0.085
D	0.64	0.89	0.025	0.035
F	0.08	0.18	0.003	0.007
H	1.30	1.55	0.051	0.061
J	0.64	0.89	0.025	0.035
K	4.06	4.32	0.160	0.170
L	2.36	2.62	0.093	0.103
N	1.12	1.37	0.044	0.054
R	0.79	1.04	0.031	0.041
S	11.99	12.75	0.472	0.502
T	1.14	1.40	0.045	0.055
U	0.43	0.69	0.017	0.027

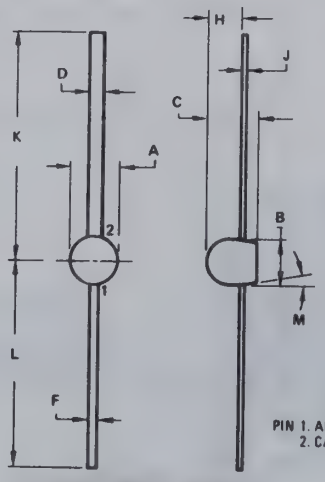
CASE 234-01


0.010
0.016
0.078
0.092
1
2
0.180
MIN
0.030
0.040
0.0375
RAD
0.083
0.100
0.004
0.006
3⁰
7⁰
0.078
0.092

STYLE 1:
PIN 1. EMITTER
2. COLLECTOR

STYLE 2:
PIN 1. ANODE
2. CATHODE
Cathode indicated by larger bonding pad on bottom of device.

CASE 234-02

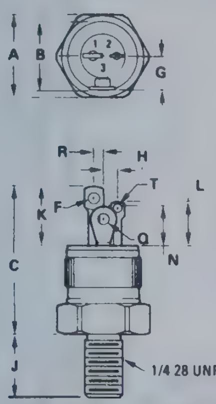

H
J
D
C
K
A
2
B
1
M
L
F

PIN 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.34	2.59	0.092	0.102
B	2.11	2.36	0.083	0.093
C	2.39	2.64	0.094	0.104
D	0.66	0.71	0.026	0.028
F	0.48	0.53	0.019	0.021
H	1.57	1.83	0.062	0.072
J	0.20	0.30	0.008	0.012
K	11.30	11.43	0.445	0.450
L	10.29	10.41	0.405	0.410
M	9⁰	11⁰	9⁰	11⁰

Dimensions are in inches unless otherwise noted

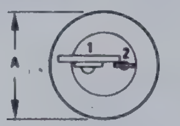
CASE 235

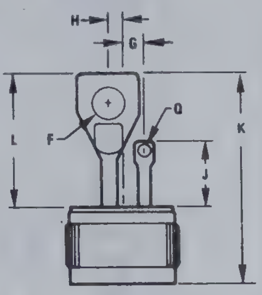


STYLE 1:
PIN 1. CATHODE
2. GATE
3. ANODE
STUD-ISOLATED
STYLE 2:
PIN 1. MAIN TERMINAL 1
2. GATE
3. MAIN TERMINAL 2
STUD-ISOLATED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.00	14.20	0.551	0.559
B	12.73	12.83	0.501	0.505
C	–	26.16	–	1 030
F	2.03	2.41	0.080	0.095
G	–	6.48	–	0.255
H	2.16	2.41	0.085	0.095
J	10.67	11.56	0.420	0.455
K	9.78	10.54	0.385	0.415
L	6.99	7.75	0.275	0.305
N	6.48	6.99	0.255	0.275
Q	3.43	3.81	0.135	0.150
R	1.52	1.78	0.060	0.070
T	1.40	1.65	0.055	0.065

CASE 237-01





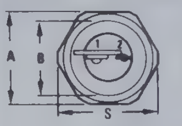
STYLE 1:
PIN 1. CATHODE
2. GATE
CASE. ANODE

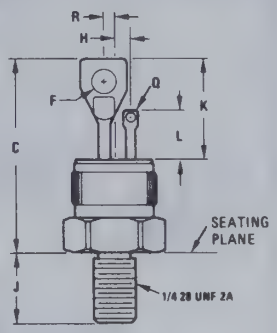
STYLE 2:
PIN 1. MT1
2. GATE
CASE MT2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.73	12.83	0.501	0.505
F	–	4.06	–	0.160
G	2.16	2.41	0.085	0.095
H	1.52	1.78	0.060	0.070
J	6.99	7.75	0.275	0.305
K	–	26.67	–	1.050
L	–	17.02	–	0.670
Q	1.40	1.65	0.055	0.065

NOTE:
1. DIM "G" & "H" TO BE MEASURED AT CAN.

CASE 238-01



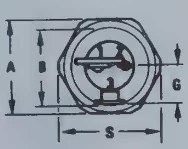


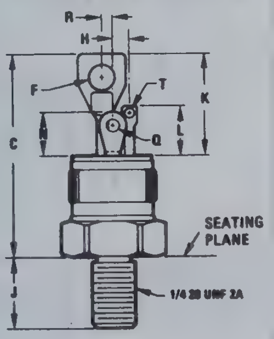
STYLE 1:
PIN 1. CATHODE
2. GATE
STUD. ANODE
STYLE 2:
PIN 1. MT1
2. GATE
STUD. MT2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.00	14.20	0.551	0.559
B	12.73	12.83	0.501	0.505
C	–	30.23	–	1.190
F	–	4.06	–	0.160
H	2.16	2.41	0.085	0.095
J	10.67	11.56	0.420	0.455
K	–	17.02	–	0.670
L	6.99	7.75	0.275	0.305
Q	1.40	1.65	0.055	0.065
R	1.52	1.78	0.060	0.070
S	15.34	15.60	0.604	0.614

NOTE:
1. DIM "H" & "R" TO BE MEASURED AT CAN.

CASE 239-01



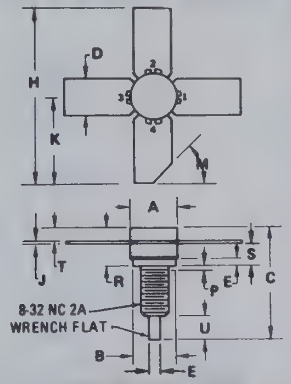


STYLE 1:
PIN 1. CATHODE
2. GATE
3. ANODE
STUD. ISOLATED
STYLE 2:
PIN 1. MT1
2. GATE
3. MT2
STUD. ISOLATED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.00	14.20	0.551	0.559
B	12.73	12.83	0.501	0.505
C	–	32.51	–	1.280
F	–	4.06	–	0.160
G	–	6.48	–	0.255
H	2.16	2.41	0.085	0.095
J	10.67	11.56	0.420	0.455
K	–	17.02	–	0.670
L	6.99	7.75	0.275	0.305
N	6.48	6.99	0.255	0.275
Q	3.43	3.81	0.135	0.150
R	1.52	1.78	0.060	0.070
S	15.34	15.60	0.604	0.614
T	1.40	1.65	0.055	0.065

NOTE:
1. DIM "G", "H" & "R" TO BE MEASURED AT CAN

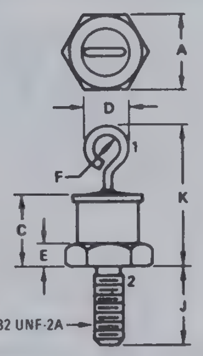
CASE 244



STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.06	7.26	0.278	0.286
B	6.25	6.45	0.246	0.254
C	15.49	16.51	0.610	0.650
D	5.59	5.84	0.220	0.230
E	1.52 NOM		0.060 NOM	
H	26.80	27.05	1.055	1.065
J	0.127 NOM		0.005 NOM	
K	13.41	13.51	0.528	0.532
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
R	4.52	5.03	0.178	0.198
S	3.00	3.25	0.118	0.128
T	1.40	1.65	0.055	0.065
U	2.92	3.68	0.115	0.145

CASE 245

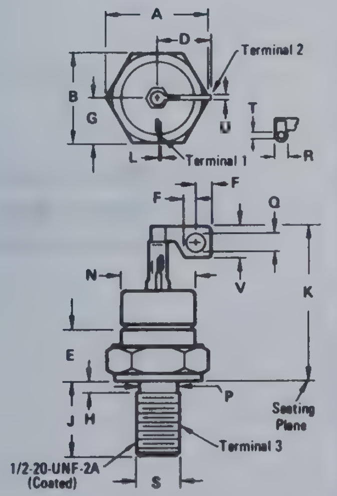


STYLE 1:
1. CATHODE
2. ANODE
STYLE 2:
1. ANODE
2. CATHODE

10-32 UNF-2A

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	10.77	11.10	0.424	0.437
C	–	10.29	–	0.405
D	–	6.35	–	0.250
E	1.91	4.45	0.075	0.175
F	1.52	–	0.060	–
J	10.72	11.51	0.422	0.453
K	–	20.32	–	0.800

CASE 246 TO-83

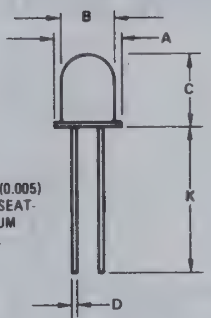


STYLE 1:
TERMINAL 1. GATE
2. CATHODE
3. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	31.16	–	1.227
B	26.19	27.00	1.031	1.063
D	–	16.51	–	0.650
E	4.4	12.70	0.170	0.500
F	4.58	–	0.180	–
G	–	14.60	–	0.575
H	–	3.17	–	0.125
J	20.25	21.00	0.797	0.827
K	–	45.97	–	1.810
L	0.31	1.27	0.012	0.050
N	–	26.18	–	1.031
P	10.80	12.67	0.425	0.499
Q	4.58	6.60	0.180	0.260
R	2.93	4.06	0.115	0.160
S	11.733	11.874	0.4619	0.4675
T	1.53	2.03	0.060	0.080
U	1.53	2.92	0.060	0.115
V	9.2	11.9	0.360	0.470

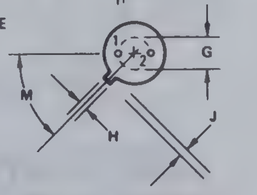
All JEDEC dimensions and notes apply

CASE 247



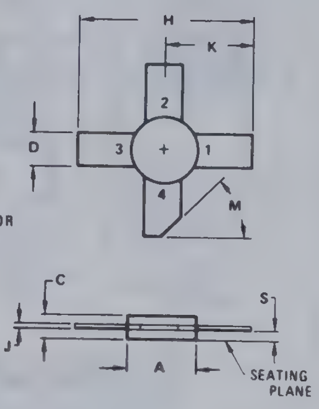
NOTE:
1. LEADS WITHIN 0.13 mm (0.005) OF TRUE POSITION AT SEATING PLANE, AT MAXIMUM MATERIAL CONDITION.

STYLE 1
PIN 1. ANODE
PIN 2. CATHODE



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.70	5.33	0.185	0.210
C	5.08	5.72	0.200	0.225
D	0.41	0.48	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	–	0.500	–
M	45° BSC		45° BSC	

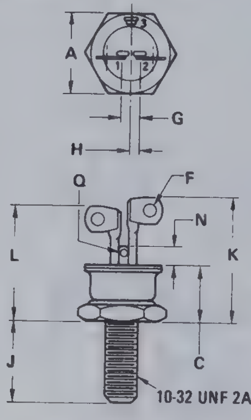
CASE 249



STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.06	7.26	0.278	0.286
C	2.92	3.35	0.115	0.132
D	5.59	5.84	0.220	0.230
H	26.67	27.18	1.050	1.070
J	0.10	0.15	0.004	0.006
K	13.34	13.59	0.525	0.535
M	40°	50°	40°	50°
S	1.40	1.65	0.055	0.065

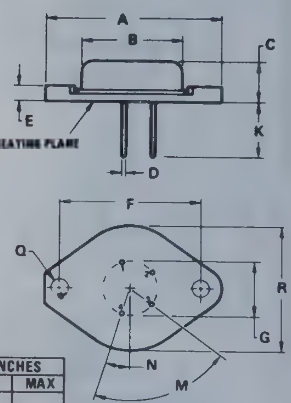
CASE 250-01



STYLE 1:
PIN 1. GATE
2. CATHODE
3. ANODE
STUD – ISOLATED
STYLE 2:
PIN 1. GATE
2. ANODE 1
3. ANODE 2
STUD – ISOLATED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	11.10	–	0.437
C	–	10.92	–	0.430
F	1.65	1.91	0.065	0.075
G	2.29	2.79	0.090	0.110
H	1.14	1.40	0.045	0.055
J	10.72	11.48	0.422	0.452
K	–	16.76	–	0.660
L	—	15.49	–	0.610
N	3.43	3.68	0.135	0.145
Q	1.65	1.91	0.065	0.075

CASE 253

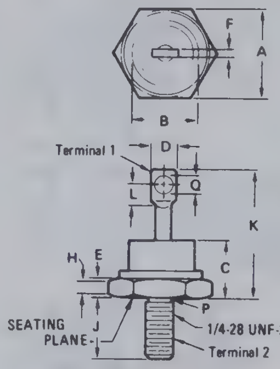


STYLE 1:
PIN 1. EMITTER 2
2. BASE 2
3. BASE 1
4. EMITTER 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	38.61	–	1.520
B	–	21.08	–	0.830
C	6.35	8.13	0.250	0.320
D	0.97	1.09	0.038	0.043
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	11.94 BSC		0.470 BSC	
K	7.11	8.13	0.280	0.320
M	72° BSC		72° BSC	
N	18° BSC		18° BSC	
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050

NOTE.
1. LEADS WITHIN 0.13 mm (0.005) DIA OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.

CASE 257 DO-05

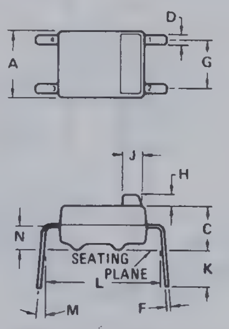


STYLE 1:
TERM. 1. CATHODE
2. ANODE
STYLE 2:
TERM. 1. ANODE
2. CATHODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.94	17.45	0.667	0.687
B	–	16.94	–	0.667
C	–	11.43	–	0.450
D	–	9.53	–	0.375
E	2.92	5.08	0.115	0.200
F	–	2.03	–	0.080
H	1.52	–	0.060	–
J	10.72	11.51	0.422	0.453
K	–	25.40	–	1.000
L	3.86	–	0.152	–
P	5.59	6.32	0.220	0.249
Q	3.56	4.45	0.140	0.175

NOTES:
1. Dimension "P" is diameter.
2. All JEDEC dimensions and notes apply.

CASE 259-01



STYLE 1:
PIN 1. SOURCE
2. DRAIN
3. GATE 2
4. GATE 1

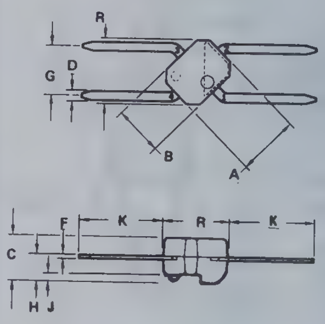
STYLE 2:
PIN 1. POS
2. A/C
3. A/C
4. NEG

STYLE 3:
PIN 1. SOURCE
2. GATE 1
3. GATE 2
4. DRAIN

NOTE:
1. LEADS WITHIN 0.13 (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE WITH MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.21	5.59	0.205	0.220
C	3.43	4.06	0.135	0.160
D	0.64	0.89	0.025	0.035
F	0.20	0.30	0.008	0.012
G	4.32 BSC		0.170 BSC	
H	0.64	0.89	0.025	0.035
J	1.50	1.75	0.059	0.069
K	2.54	3.56	0.100	0.140
L	9.02	9.27	0.355	0.365
M	–	10°	–	10°
N	1.14	1.40	0.045	0.055

CASE 262-02



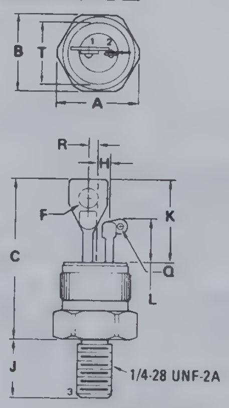
STYLE 1:
PIN 1. SOURCE
2. DRAIN
3. GATE 2
4. GATE 1

STYLE 2:
PIN 1. COLLECTOR
2. BASE
3. EMITTER
4. BASE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.95	5.21	0.195	0.205
B	3.94	4.19	0.155	0.165
C	2.67	2.92	0.105	0.115
D	0.64	0.89	0.025	0.035
F	0.20	0.30	0.008	0.012
G	4.06 BSC		0.160 BSC	
H	1.57	1.83	0.062	0.072
J	0.51	0.76	0.020	0.030
K	6.35	7.62	0.250	0.300
R	5.21	5.46	0.205	0.215

NOTE:
1. LEADS WITHIN 0.13 mm (0.005) RAD OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION.

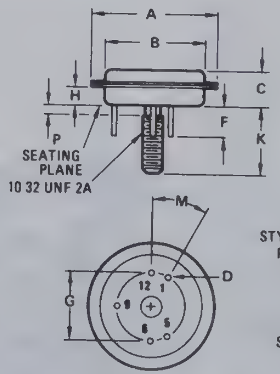
CASE 263-02



STYLE 1:
PIN 1. CATHODE
2. GATE
3. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	15.34	15.60	0.604	0.614
B	14.00	14.20	0.551	0.559
C	26.67	30.23	1.050	1.190
F	3.43	4.06	0.135	0.160
H	2.29 REF		0.090 REF	
J	10.67	11.56	0.420	0.455
K	15.75	17.02	0.620	0.670
L	7.62	8.89	0.300	0.350
Q	1.40	1.65	0.055	0.065
R	1.65 REF		0.065 REF	
T	12.73	12.83	0.501	0.505

CASE 264



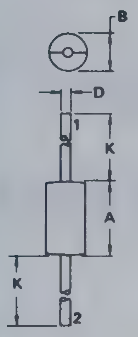
STYLE 1:
PIN 1. GROUND
5. GROUND
6. RF OUT
9. B+
12. RF IN
STUD GROUND

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	29.21	31.75	1.150	1.250
B	24.64	25.65	0.970	1.010
C	8.26	8.76	0.325	0.345
D	0.71	0.81	0.028	0.032
F	4.06	5.08	0.160	0.200
G	19.05 BSC		0.750 BSC	
H	4.32	4.83	0.170	0.190
K	10.92	11.94	0.430	0.470
M	30° BSC		30° BSC	
P	–	2.79	–	0.110

NOTE:
1. DIM "M" ALSO APPLIES BETWEEN LEADS 5 / 6.

Dimensions are in inches unless otherwise noted

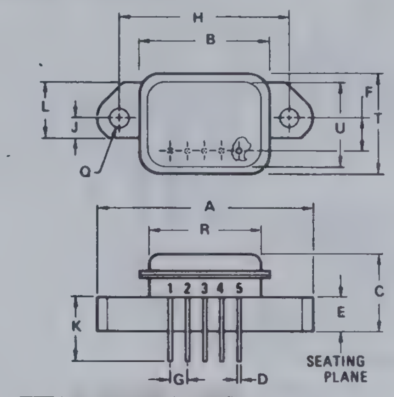
CASE 267



STYLE 1:
PIN 1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	9.65	0.370	0.380
B	4.83	5.33	0.190	0.210
D	1.22	1.32	0.048	0.052
K	26.97	27.23	1.062	1.072

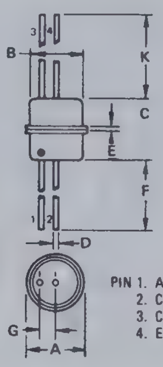
CASE 270-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	46.99	48.01	1.850	1.890
B	29.46	30.48	1.160	1.200
C	14.35	15.11	0.565	0.595
D	0.69	0.84	0.027	0.033
E	4.95	5.46	0.195	0.215
F	7.62	7.87	0.300	0.310
G	4.06 BSC		0.160 BSC	
H	37.97	38.23	1.495	1.505
J	4.57	4.83	0.180	0.190
K	9.14	10.16	0.360	0.400
L	12.57	12.83	0.495	0.505
Q	3.99	4.24	0.157	0.167
R	24.94	25.19	0.982	0.992
T	23.11	24.13	0.910	0.950
U	18.47	18.72	0.727	0.737

STYLE 1:
PIN 1. RF IN
2. DC & RF GROUND
3. B+ INPUT
4. DC & RF GROUND
5. RF OUT

CASE 271-02

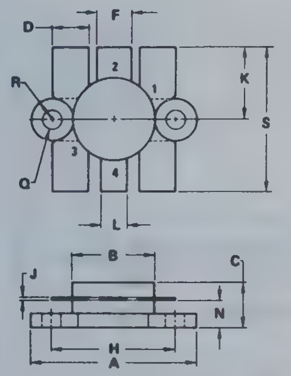


PIN 1. ANODE
2. CATHODE
3. COLLECTOR
4. EMITTER

NOTE:
POLARITY DOT ON PACKAGE DENOTES PIN 1.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.70	4.95	0.185	0.195
B	4.06	4.32	0.160	0.170
C	4.95	5.21	0.195	0.205
D	0.38	0.51	0.015	0.020
E	0.36	0.46	0.014	0.018
F	26.67	30.48	1.050	1.200
G	1.27 BSC		0.050 BSC	
K	20.32	24.13	0.800	0.950

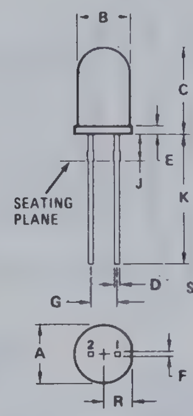
CASE 278-03



STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. EMITTER
4. BASE
FLANGE-ISOLATED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.38	25.15	0.960	0.990
B	12.45	12.95	0.490	0.510
C	5.97	7.62	0.235	0.300
D	5.46 TYP		0.215 TYP	
F	5.08	5.33	0.200	0.210
H	18.29	18.54	0.720	0.730
J	0.10	0.15	0.004	0.006
K	10.67	10.92	0.420	0.430
L	3.81	4.06	0.150	0.160
N	3.81	4.32	0.150	0.170
Q	2.92	3.18	0.115	0.125
R	3.05	3.30	0.120	0.130
S	21.34	21.84	0.840	0.860

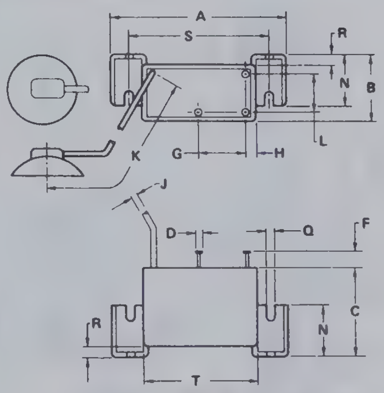
CASE 279-01



STYLE 1:
PIN 1. CATHODE
2. ANODE

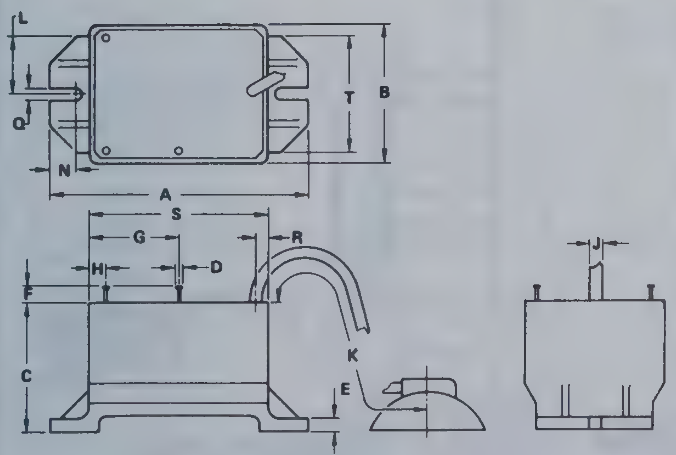
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.72	5.97	0.225	0.235
B	4.95	5.21	0.195	0.205
C	8.38	8.89	0.330	0.350
D	0.41	0.51	0.016	0.020
E	0.64	0.89	0.025	0.035
F	0.30	0.46	0.012	0.018
G	2.44	2.64	0.096	0.104
J	2.44	2.54	0.096	0.100
K	12.57	13.21	0.495	0.520
R	2.54	2.79	0.100	0.110

CASE 280-01



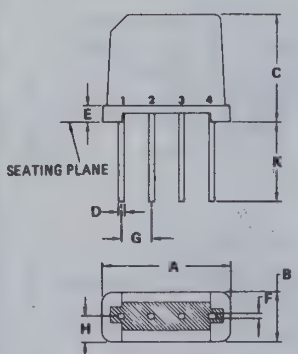
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	107.29	108.56	4.224	4.274
B	41.02	41.53	1.615	1.635
C	53.72	54.23	2.115	2.135
D	3.68	3.94	0.145	0.155
F	9.40	9.65	0.370	0.380
G	31.12	31.37	1.225	1.235
H	3.68	3.94	0.145	0.155
J	3.81	–	0.150	–
K	76.20	–	3.000	–
L	27.31	27.56	1.075	1.085
N	31.50	32.00	1.240	1.260
Q	4.70	4.95	0.185	0.195
R	6.10	6.60	0.240	0.260
S	85.60	85.85	3.370	3.380
T	69.85	70.10	2.750	2.760

CASE 281-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	98.68	100.20	3.885	3.945
B	53.09	53.59	2.090	2.110
C	49.28	49.78	1.940	1.960
D	3.56	3.94	0.140	0.155
E	4.50	5.00	0.177	0.197
F	5.08	9.62	0.200	0.380
G	34.04	34.54	1.340	1.360
H	6.10	6.60	0.240	0.260
J	3.81	–	0.150	–
K	76.20	–	3.000	–
L	21.84	22.35	0.860	0.880
N	7.37	7.87	0.290	0.310
Q	4.70	4.95	0.185	0.195
R	4.83	5.33	0.190	0.210
S	68.71	69.22	2.705	2.725
T	43.94	44.45	1.730	1.750

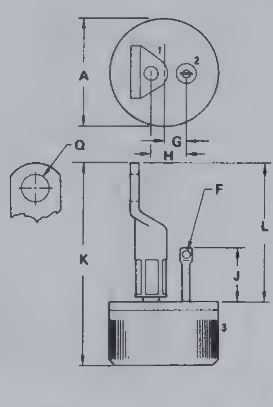
CASE 282-01



STYLE 1:
PIN 1. POSITIVE OUTPUT
2. AC INPUT
3. AC INPUT
4. NEGATIVE OUTPUT

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.38	16.89	0.646	0.690
B	5.59	7.11	0.220	0.280
C	13.59	13.97	0.535	0.550
D	0.64	1.02	0.027	0.037
E	1.78	2.03	0.070	0.080
F	0.51	0.89	0.022	0.028
G	3.81 BSC		0.150 BSC	
H	2.79	3.56	0.110	0.140
K	7.62	12.70	0.300	0.500

CASE 287-01

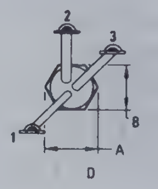


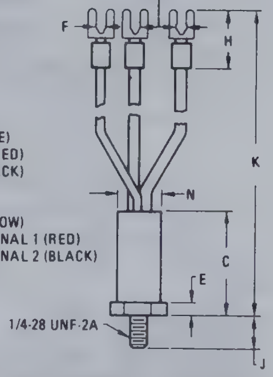
STYLE 1:
TERM. 1. CATHODE
2. GATE
3. CASE, ANODE

STYLE 2:
TERM. 1. MAIN TERM. 1
2. GATE
3. CASE, MAIN TERM. 2

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	19.05	19.30	0.750	0.760
F	1.27	1.65	0.050	0.065
G	3.68	3.94	0.145	0.155
H	5.97	6.22	0.235	0.245
J	9.27	9.53	0.365	0.375
K	36.20	37.47	1.425	1.475
L	25.40	26.67	1.000	1.050
Q	4.83	5.21	0.190	0.205

CASE 289-01

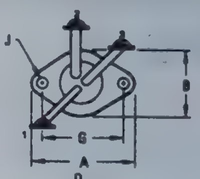


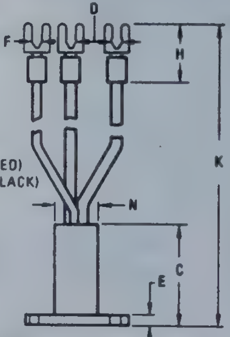


STYLE 1:
TERM 1. GATE (WHITE)
2. CATHODE (RED)
3. ANODE (BLACK)
STUD-ISOLATED
STYLE 2:
TERM 1. GATE (YELLOW)
2. MAIN TERMINAL 1 (RED)
3. MAIN TERMINAL 2 (BLACK)
STUD-ISOLATED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	20.14	–	0.793
B	17.20	17.35	0.677	0.683
C	33.68	38.10	1.325	1.500
D	–	5.03	–	0.198
E	4.57	5.08	0.180	0.200
F	–	4.52	–	0.178
H	21.84	23.11	0.860	0.910
J	10.85	11.35	0.427	0.447
K	203.20	228.60	8.000	9.000
N	15.75	16.00	0.620	0.630

CASE 290-01



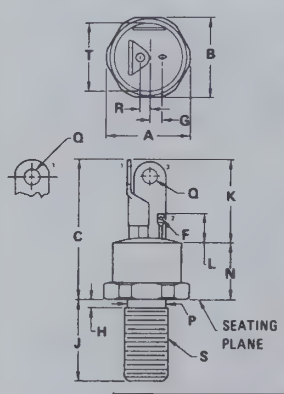


STYLE 1:
TERM. 1 GATE (WHITE)
2. CATHODE (RED)
3. ANODE (BLACK)
BASE • ISOLATED

STYLE 2:
TERM. 1. GATE (YELLOW)
2 MAIN TERMINAL 1 (RED)
3. MAIN TERMINAL 2 (BLACK)
BASE • ISOLATED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	38 23	38.40	1.505	1.515
B	24.64	25.40	0.970	1.000
C	33 68	38.10	1.325	1.500
D	–	5.03	–	0.198
E	3.05	3.30	0.120	0.130
F	–	4 52	–	0.178
G	–	30 23	–	1.190
H	21.84	23.11	0.860	0.910
J	–	40.39	-	0.159
K	203.20	228.60	8.000	9.000
N	15.75	16.00	0.620	0.630

CASE 291-01

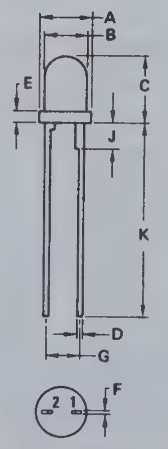


STYLE 1:
PIN 1. CATHODE
2. GATE
3. ANODE
STUD. ISOLATED

STYLE 2:
PIN 1. MAIN TERM. 1
2. GATE
3. MAIN TERM. 2
STUD. ISOLATED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	29.72	30.23	1.170	1.190
B	26.42	27.05	1.040	1.065
C	45.72	48.26	1.800	1.900
F	1.27	1.65	0.050	0.065
G	3.68	3.94	0.145	0.155
H	2.29	2.79	0.090	0.110
J	21.59	22.48	0.850	0.885
K	22.86	27.94	0.900	1.100
L	5.08	9.53	0.200	0.375
N	22.10	23.11	0.870	0.910
P	11.43	11.94	0.450	0.470
Q	4.83	5.21	0.190	0.205
R	2.16	2.41	0.085	0.095
S	1/2 – 20 UNF – 2A			
T	25.27	25.78	0.995	1.015

CASE 292-01

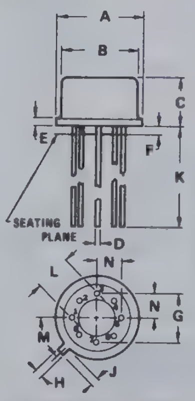


NOTE:
1. CATHODE
2. ANODE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.68	3.94	0.145	0.155
B	2.92	3.18	0.115	0.125
C	4.95	5.21	0.195	0.205
D	0.38	0.48	0.015	0.019
E	0.76	1.02	0.030	0.040
F	0.20	0.30	0.008	0.012
G	2.41	2.67	0.095	0.105
J	1.78	2.03	0.070	0.080
K	12.70	–	0.500	–

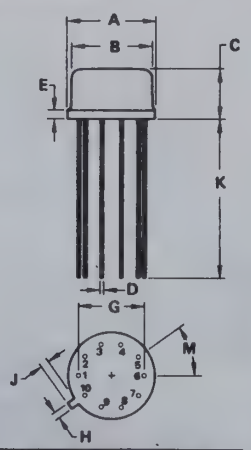
Dimensions are in inches unless otherwise noted

CASE 601-03



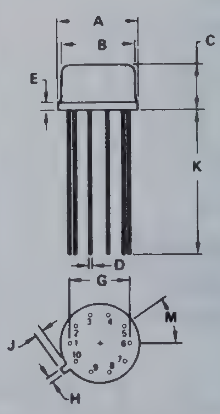
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.75	8.51	0.305	0.335
C	4.19	4.70	0.165	0.185
D	0.41	0.48	0.016	0.019
E	0.25	1.02	0.010	0.040
F	0.25	1.02	0.010	0.040
G	5.08 BSC		0.200 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	12.70	–	0.500	–
L	3.56	4.06	0.140	0.160
M	45° BSC		45° BSC	
N	2.41	2.67	0.095	0.105

CASE 602A-03



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.39	0.335	0.370
B	7.75	8.50	0.305	0.335
C	–	4.57	–	0.180
D	0.41	0.48	0.016	0.019
E	–	1.02	–	0.040
G	5.84 BSC		0.230 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	12.70	–	0.500	–
M	36° BSC		36° BSC	

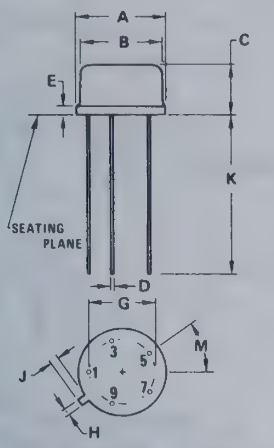
CASE 602B-03



NOTE:
1. LEADS WITHIN 0.13 mm (0.005) RAD OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.

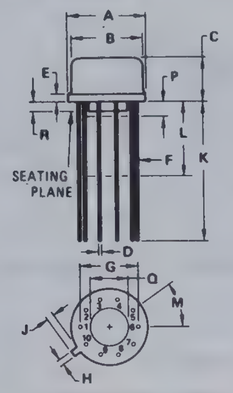
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.39	0.335	0.370
B	7.75	8.50	0.306	0.335
C	–	4.57	–	0.180
D	0.41	0.48	0.016	0.019
E	–	1.02	–	0.040
G	5.84 BSC		0.230 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	19.05	–	0.750	–
M	36° BSC		36° BSC	

CASE 602C-03



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.39	0.335	0.370
B	7.75	8.50	0.305	0.335
C	–	4.57	–	0.180
D	0.41	0.48	0.016	0.019
E	–	1.02	–	0.040
G	5.84 BSC		0.230 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	19.05	–	0.750	–
M	36° BSC		36° BSC	

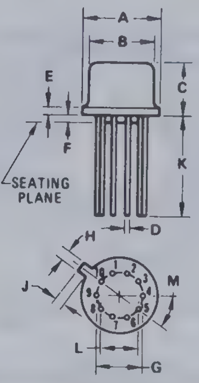
CASE 603-02 TO-100



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.39	0.335	0.370
B	7.75	8.51	0.305	0.335
C	4.19	4.70	0.165	0.185
D	0.407	0.533	0.016	0.021
E	–	1.02	–	0.040
F	0.406	0.483	0.016	0.019
G	5.84 BSC		0.230 BSC	
H	0.712	0.864	0.028	0.034
J	0.737	1.14	0.029	0.045
K	12.70	–	0.500	–
L	6.35	12.70	0.250	0.500
M	36° BSC		36° BSC	
P	–	1.27	–	0.050
Q	3.56	4.06	0.140	0.160
R	0.254	1.02	0.010	0.040

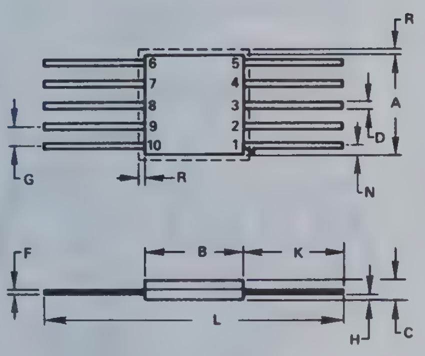
All JEDEC dimensions and notes apply

CASE 603-03



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.335	.370	8.51	9.39
B	.305	.335	7.75	8.50
C	.240	.260	6.09	6.60
D	.016	.019	.407	.482
E	–	.040	–	1.01
F	–	.040	–	1.01
G	.230 TYP		5.84 TYP	
H	.028	.034	.712	.863
J	.029	.045	.736	1.14
K	.500	–	12.70	–
L	.140	.160	3.56	4.06
M	36° TP		36° TP	

CASE 606-04 TO-91

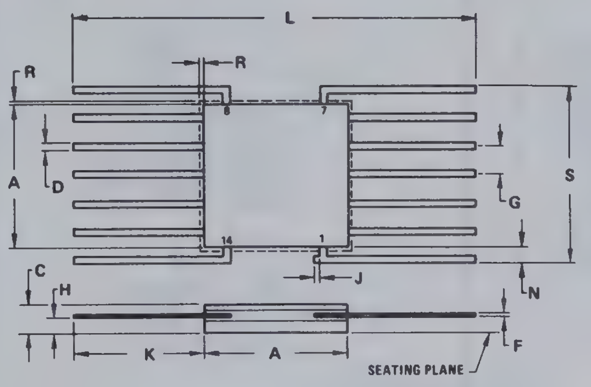


NOTE:
1. LEADS WITHIN 0.25 mm (0.010) TOTAL OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION (AT BODY)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	7.36	0.240	0.290
B	6.10	6.60	0.240	0.260
C	0.762	1.77	0.030	0.070
D	0.254	0.482	0.010	0.019
F	0.077	0.152	0.003	0.006
G	1.15	1.39	0.045	0.055
H	0.127	0.889	0.005	0.035
K	1.78	–	0.070	–
R	–	0.381	–	0.015

All JEDEC dimensions and notes apply

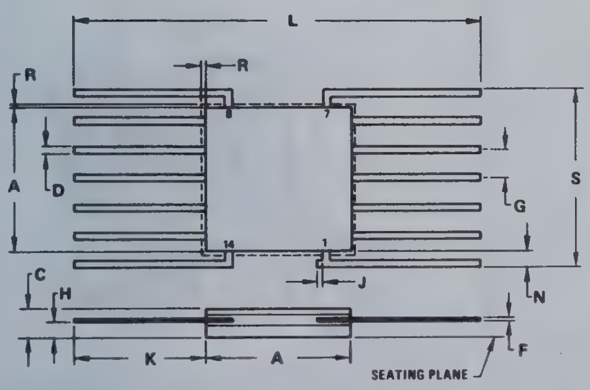
CASE 607-04



STYLE 1:
PIN 1. COLLECTOR
2. BASE
3. EMITTER
4. NOT CONNECTED
5. EMITTER
6. BASE
7. COLLECTOR
8. COLLECTOR
9. BASE
10. EMITTER
11. NOT CONNECTED
12. EMITTER
13. BASE
14. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	6.99	0.240	0.275
C	0.76	2.03	0.030	0.080
D	0.25	0.48	0.010	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.13	0.89	0.005	0.035
J	–	0.38	–	0.015
K	6.35	–	0.250	–
L	18.80	–	0.740	–
N	0.25	–	0.010	–
R	–	0.38	–	0.015
S	7.62	8.38	0.300	0.330

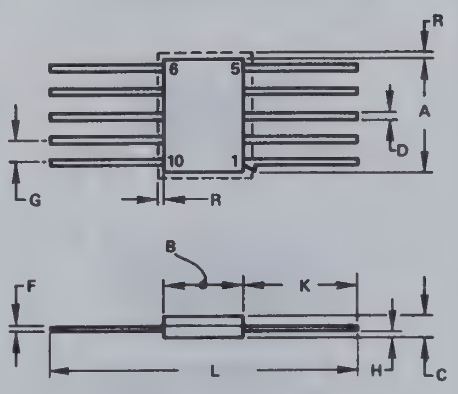
CASE 607-05



STYLE 1:
PIN 1. COLLECTOR
2. BASE
3. EMITTER
4. NOT CONNECTED
5. EMITTER
6. BASE
7. COLLECTOR
8. COLLECTOR
9. BASE
10. EMITTER
11. NOT CONNECTED
12. EMITTER
13. BASE
14. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	6.60	0.240	0.260
C	0.76	1.78	0.030	0.070
D	0.33	0.48	0.013	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.30	0.89	0.012	0.035
J	–	0.38	–	0.015
K	6.35	9.40	0.250	0.370
L	18.80	–	0.740	–
N	0.25	–	0.010	–
R	–	0.38	–	0.015
S	7.62	8.38	0.300	0.330

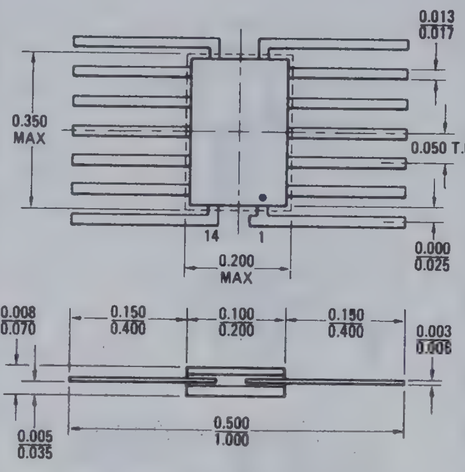
CASE 608-02 TO-90



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	7.36	0.240	0.290
B	4.07	4.69	0.160	0.185
C	0.762	1.77	0.030	0.070
D	0.254	0.482	0.010	0.019
F	0.077	0.152	0.003	0.006
G	1.15	1.39	0.045	0.055
H	0.127	0.889	0.005	0.035
K	1.78	–	0.070	–
R	–	0.381	–	0.015

All JEDEC dimensions and notes apply

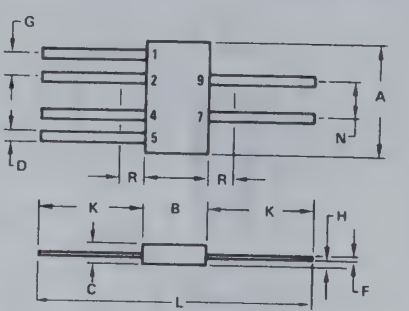
CASE 609 TO-85


0.013
0.017
0.350
MAX
0.050 T.P.
14
1
0.200
MAX
0.000
0.025
0.008
0.070
0.150
0.400
0.100
0.200
0.150
0.400
0.003
0.006
0.005
0.035
0.500
1.000

Lead 1 identified by color dot or by elbow on lead.

All JEDEC dimensions and notes apply

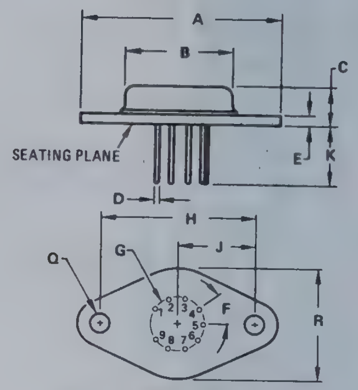
CASE 610A-03


G
1
2
9
4
7
5
A
N
D
R
R
K
B
K
H
C
L
F

STYLE 1:
PIN 1. BASE
2. EMITTER
4. EMITTER
5. BASE
7. COLLECTOR
9. COLLECTOR

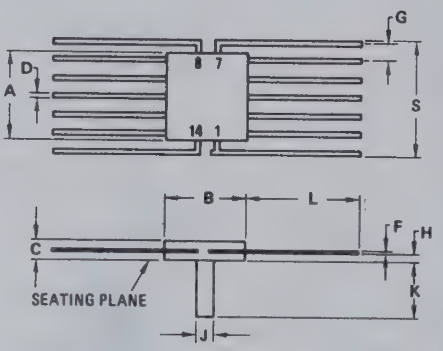
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	7.36	0.240	0.290
B	2.92	4.06	0.115	0.160
C	0.76	2.03	0.030	0.080
D	0.36	0.48	0.014	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	–	0.89	–	0.035
K	3.81	–	0.150	–
N	2.54 BSC		0.100 BSC	
R	–	1.27	–	0.050

CASE 614-02


A
B
C
SEATING PLANE
E
K
D
H
J
Q
G
1
2
3
4
5
6
7
8
9
F
R

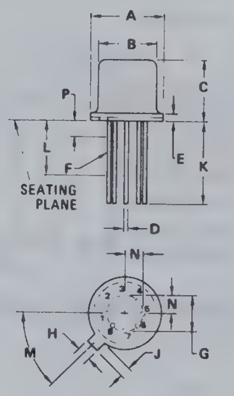
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	31.80	–	1.252
B	11.94	12.70	0.470	0.500
C	6.35	8.64	0.250	0.340
D	0.71	0.81	0.028	0.032
E	1.27	1.90	0.050	0.075
F	36° BSC		36°BSC	
G	8.26 BSC		0.325 BSC	
H	24.33	24.43	0.958	0.962
J	12.17	12.22	0.479	0.481
K	9.14	–	0.360	–
Q	3.61	3.86	0.142	0.152
R	–	17.78	–	0.700

CASE 617-04


G
D
A
8
7
14
1
S
B
L
C
F
H
SEATING PLANE
K
J

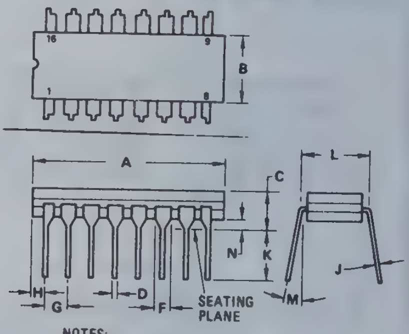
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	6.86	0.240	0.270
B	4.06	5.08	0.160	0.200
C	1.14	1.78	0.045	0.070
D	0.33	0.46	0.013	0.018
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.38	0.76	0.015	0.030
J	1.47	1.60	0.058	0.063
K	2.41	2.79	0.095	0.110
L	6.35	–	0.250	–
P	1.52 BSC		0.060 BSC	
S	7.64	8.31	0.301	0.327

CASE 619-02


A
B
P
C
L
F
E
K
SEATING
PLANE
D
N
N
H
M
J
G

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.75	8.51	0.305	0.335
C	4.19	4.70	0.165	0.185
D	0.41	0.53	0.016	0.021
E	0.38	1.02	0.015	0.040
F	0.41	0.48	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	12.70	19.05	0.500	0.750
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	
P	–	1.27	–	0.050

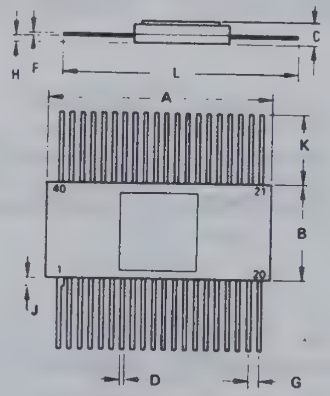
CASE 620-02


16
9
1
8
B
A
L
C
N
K
J
H
G
D
F
SEATING
PLANE
M

NOTES:
1 LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE
2 AT MAXIMUM MATERIAL CONDITION' PKG. INDEX: NOTCH IN LEAD NOTCH IN CERAMIC OR INK DOT'
3 DIM "L" TO CENTER OF LEADS WHEN FORMED PARALLEL'

DIM	MILLIMETERS		. INCHES	
	MIN	MAX	MIN	MAX
A	19.05	19.81	0.750	0.780
B	6.22	6.99	0.245	0.275
C	4.06	5.08	0.160	0.200
D	0.38	0.51	0.015	0.020
F	1.40	1.65	0.055	0.065
G	2.54 BSC		0.100 BSC	
H	0.51	1.14	0.020	0.045
J	0.20	0.31	0.008	0.012
K	3.18	4.06	0.125	0.160
L	7.37	7.87	0.290	0.310
M	–	15°	–	15°
N	0.51	1.02	0.020	0.040

CASE 621

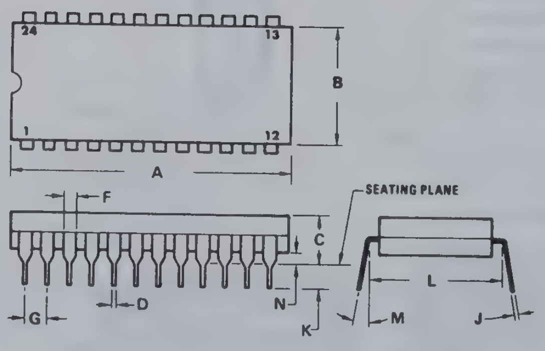

C
H
F
L
A
K
40
21
B
1
20
J
D
G

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	25.40	26.41	1.000	1.040
B	10.16	10.67	0.400	0.420
C	1.52	2.54	0.060	0.100
D	0.33	0.43	0.013	0.017
F	0.10	0.15	0.004	0.006
G	1.27 BSC		0.050 BSC	
H	0.51	0.89	0.020	0.035
J	0.25	1.27	0.010	0.050
K	7.49	7.75	0.295	0.305
L	25.15	26.16	0.990	1.030

NOTE
1. LEADS WITHIN 0.25 mm (0.010) TOTAL OF TRUE POSITION AT BODY, AT MAXIMUM MATERIAL CONDITION.

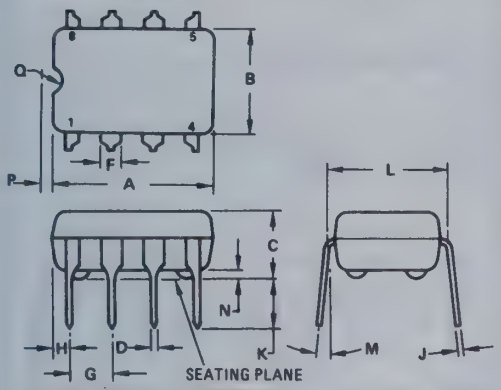
CASE 623

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	31.24	32.26	1.230	1.270
B	12.70	13.72	0.500	0.540
C	4.06	5.08	0.160	0.200
D	0.41	0.51	0.016	0.020
F	1.27	1.52	0.050	0.060
G	2.54 BSC		0.100 BSC	
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	15.37 BSC		0.605 BSC	
M	5°	15°	5°	15°
N	0.51	0.76	0.020	0.030


24
13
B
1
12
A
F
SEATING PLANE
C
N
K
G
D
L
M
J

NOTES:
1. DIM "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.
2. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION. (WHEN FORMED PARALLEL)

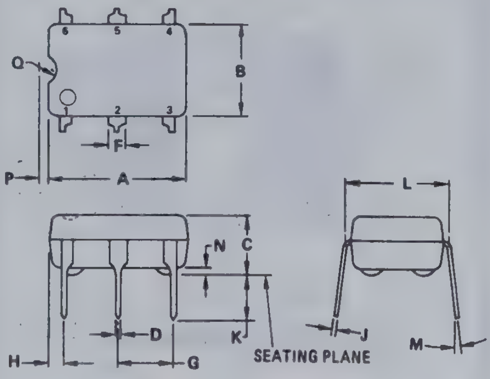
CASE 626



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	–	10°	–	10°
N	0.51 NOM		0.020 NOM	
P	0.13	0.38	0.005	0.015
Q	0.76	1.02	0.030	0.040

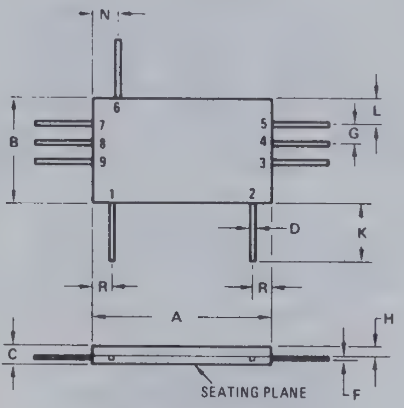
NOTE:
DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.

CASE 627-02



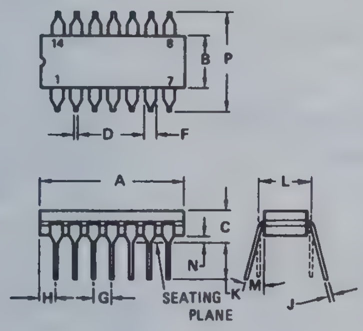
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	3.81 BSC		0.150 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	–	10°	–	10°
N	0.51 NOM		0.020 NOM	
P	0.13	0.38	0.005	0.015
Q	0.76	1.02	0.030	0.040

CASE 631



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	25.25	25.65	0.990	1.010
B	12.32	13.21	0.485	0.520
C	2.16	2.67	0.085	0.105
D	0.58	0.69	0.023	0.027
F	0.10	0.23	0.004	0.009
G	2.54 BSC		0.100 BSC	
H	1.65	1.91	0.065	0.075
K	8.00	8.51	0.315	0.335
L	3.56	4.06	0.140	0.160
N	3.48	3.73	0.137	0.147
R	2.59	2.84	0.102	0.112

CASE 632 TO-116

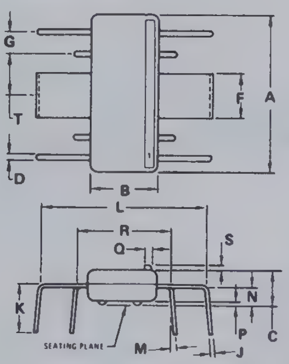


NOTE:
DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.8	19.9	0.660	0.785
B	5.59	7.11	0.220	0.280
C	–	5.08	–	0.200
D	0.381	0.584	0.015	0.023
F	0.77	1.77	0.030	0.070
G	2.54 BSC		0.100 BSC	
J	0.203	0.381	0.008	0.015
K	2.54	–	0.100	–
L	7.62 BSC		0.300 BSC	
M	–	15°	–	15°
N	0.51	0.76	0.020	0.030
P	–	8.25	–	0.325

All JEDEC' dimensions and notes apply.

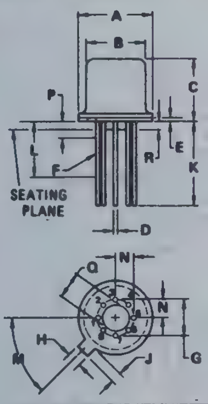
CASE 641A-02



NOTES:
1. LEADS WITHIN 0.25 mm (0.010) TOTAL OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
2. DIMENSIONS "L" AND "R" TO CENTER OF LEADS WHEN FORMED PARALLEL.
3. 0.25 mm (0.010) MAX FLASH PERMITTED AT PARTING LINE (PERIMETER).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.92	19.18	0.745	0.755
B	7.49	7.75	0.295	0.305
C	4.06	4.57	0.160	0.180
D	0.76	1.27	0.030	0.050
F	5.84	6.35	0.230	0.250
G	2.03 BSC		0.080 BSC	
J	0.33	0.43	0.013	0.017
K	4.45	5.33	0.175	0.210
L	18.80	19.30	0.740	0.760
M	–	10°	–	10°
N	2.16	2.67	0.085	0.105
P	0.38	0.64	0.015	0.025
Q	1.52	1.78	0.060	0.070
R	11.68	12.19	0.460	0.480
S	0.64	0.89	0.025	0.035
T	5.08 BSC		0.200 BSC	

CASE 642-01 TO-76

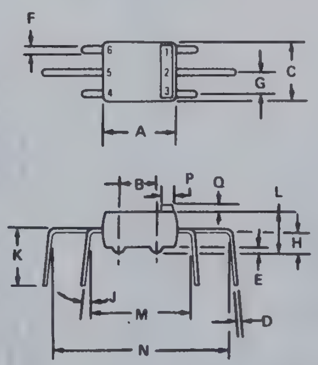


STYLE 1:
PIN 1. DRAIN 1
2. NOT USED
3. GATE 1
4. SUBSTRATE
5. GATE 2
6. NOT USED
7. DRAIN 2
8. SOURCE 1
STYLE 2:
PIN 1. DRAIN 1
2. SOURCE 1
3. GATE 1
4. CASE / SUBSTRATE
5. GATE 2
6. SOURCE 2
7. DRAIN 2
8. NO CONNECTION

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7.75	8.51	0.305	0.335
C	6.10	6.60	0.240	0.260
D	0.406	0.533	0.016	0.021
E	–	1.02	–	0.040
F	0.406	0.483	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.711	0.864	0.028	0.034
J	0.737	1.14	0.029	0.045
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	
P	–	1.27	–	0.050
Q	3.56	4.06	0.140	0.160
R	0.254	1.02	0.010	0.040

All JECEC dimensions and notes apply

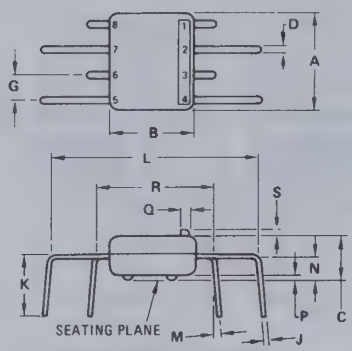
CASE 643A-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.600	7.110	0.260	0.280
B	3.180	3.430	0.125	0.135
C	5.330	5.840	0.210	0.230
D	0.203	0.305	0.008	0.012
E	0.508	0.762	0.020	0.030
F	0.635	0.889	0.025	0.035
G	1.910	2.160	0.075	0.085
H	1.650	2.030	0.065	0.080
J	–	10°	–	10°
K	4.450	5.330	0.175	0.210
L	3.430	4.060	0.135	0.160
M	8.640	9.650	0.340	0.380
N	15.750	16.760	0.620	0.660
P	1.500	1.750	0.059	0.069
Q	0.635	0.889	0.025	0.035

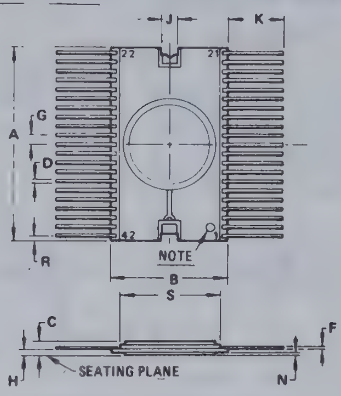
Dimensions are in inches unless otherwise noted

CASE 644A-02



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.37	7.87	0.290	0.310
B	6.60	6.86	0.260	0.270
C	3.43	4.06	0.135	0.160
D	0.64	0.89	0.025	0.035
G	2.03 BSC		0.080 BSC	
J	0.20	0.31	0.008	0.012
K	4.45	5.33	0.175	0.210
L	16.00	16.51	0.630	0.650
M	–	10°	–	10°
N	1.65	2.03	0.065	0.080
P	0.51	0.76	0.020	0.030
Q	1.50	1.75	0.059	0.069
R	8.89	9.40	0.350	0.370
S	0.64	0.89	0.025	0.035

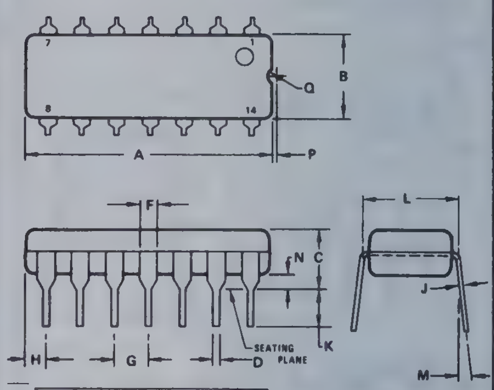
CASE 645



NOTE:
IDENTIFICATION DOT ON CERAMIC DENOTES PIN 1.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	26.52	27.28	1.044	1.074
B	16.00	16.51	0.630	0.650
C	2.03	2.92	0.080	0.115
D	0.46	0.58	0.018	0.023
F	0.20	0.30	0.008	0.012
G	1.27 BSC		0.050 BSC	
H	0.76	1.14	0.030	0.045
J	2.03 REF		0.080 REF	
K	7.37	7.87	0.290	0.310
N	0.25	0.43	0.010	0.017
R	0.56	0.94	0.022	0.037
S	13.97 REF		0.550 REF	

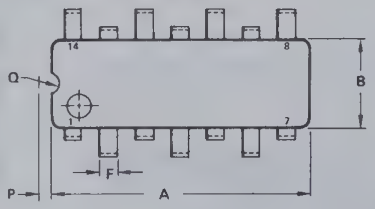
CASE 646-03



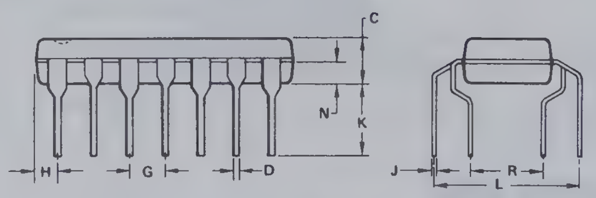
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.16	18.80	0.715	0.740
B	6.10	6.60	0.240	0.260
C	4.06	4.57	0.160	0.180
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.32	1.83	0.052	0.072
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	–	10°	–	10°
N	0.51	1.02	0.020	0.040
P	0.13	0.38	0.005	0.015
Q	0.51	0.76	0.020	0.030

NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
2. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL

CASE 647-02

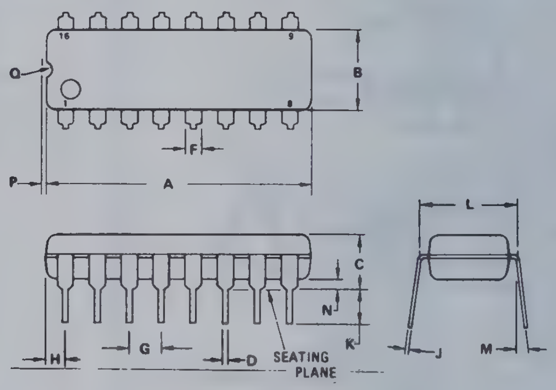


NOTE.
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.16	18.80	0.715	0.740
B	6.10	6.60	0.240	0.260
C	3.30	3.81	0.130	0.150
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.32	1.83	0.052	0.072
J	0.20	0.30	0.008	0.012
K	3.81	–	0.150	–
L	9.91	10.67	0.390	0.420
N	1.02	1.52	0.040	0.060
P	0.13	0.38	0.005	0.015
Q	0.51	0.76	0.020	0.030
R	4.83	5.59	0.190	0.220

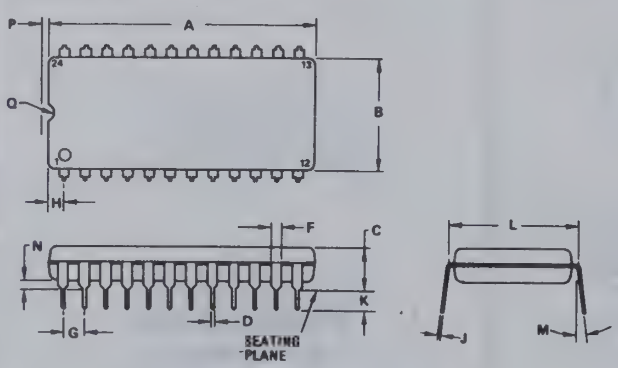
CASE 648-03



NOTES:
1. DIM "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	20.70	21.34	0.815	0.840
B	6.10	6.60	0.240	0.260
C	4.06	4.57	0.160	0.180
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.32	1.83	0.052	0.072
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	–	10°	–	10°
N	0.51	1.02	0.020	0.040
P	0.13	0.38	0.005	0.015
Q	0.51	0.76	0.020	0.030

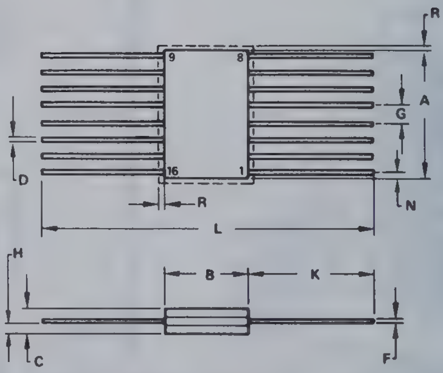
CASE 649-03



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	31.50	32.13	1.240	1.265
B	13.21	13.72	0.520	0.540
C	4.70	5.21	0.185	0.205
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.65	2.16	0.065	0.085
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	14.99	15.49	0.590	0.610
M	–	10°	–	10°
N	0.51	1.02	0.020	0.040
P	0.13	0.38	0.005	0.015
Q	0.51	0.76	0.020	0.030

Dimension "L" to lead centerline when formed parallel.

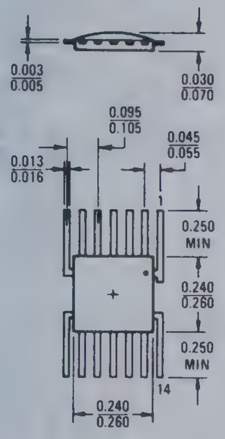
CASE 650-02



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.22	6.60	0.245	0.260
C	1.52	2.03	0.060	0.080
D	0.38	0.48	0.015	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.64	0.89	0.025	0.035
K	6.35	9.40	0.250	0.370
L	18.92	–	0.745	–
N	–	0.51	–	0.020
R	–	0.38	–	0.015

NOTES:
1. LEAD NO. 1 IDENTIFIED BY TAB ON LEAD OR DOT ON COVER.
2. LEADS WITHIN 0.13 mm (0.005) TOTAL OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION.

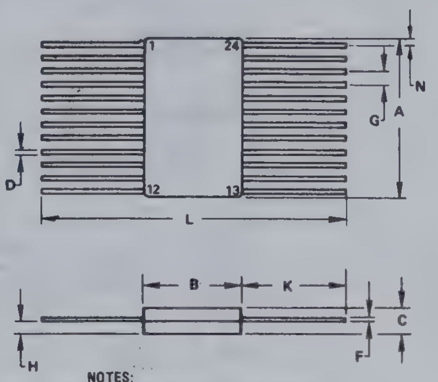
CASE 651


0.003
0.005
0.030
0.070
0.095
0.105
0.045
0.055
0.013
0.016
1
0.250
MIN
0.240
0.260
0.250
MIN
14
0.240
0.260

Lead 1 identified by color dot or by elbow on lead.
Top Cover made of silastic material.

Weight ≈ 0.197 grams

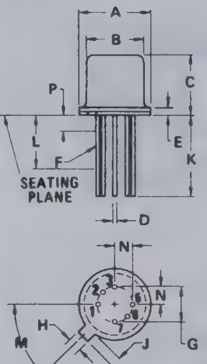
CASE 652-02


1
24
N
A
G
D
12
13
L
B
K
C
F
H

NOTES:
1. LEADS WITHIN 0.25 mm (0.010) TOTAL OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.99	15.49	0.590	0.610
B	9.27	9.91	0.365	0.390
C	1.27	2.03	0.050	0.080
D	0.38	0.48	0.015	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.027 BSC	
H	0.69	1.02	0.027	0.040
K	6.35	9.40	0.250	0.370
L	21.97	–	0.865	–
N	0.25	0.64	0.010	0.025

CASE 654-07


A
B
C
P
L
E
K
F
SEATING PLANE
D
N
1
2
3
5
6
7
8
N
H
M
J
G

STYLE 1:

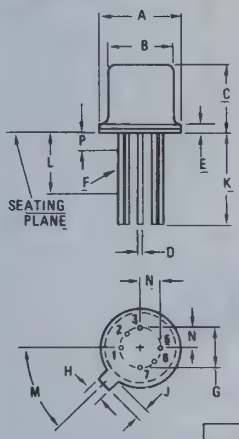
PIN 1. COLLECTOR	5. EMITTER
2. BASE	6. BASE
3. EMITTER	7. COLLECTOR
4. OMITTED	8. OMITTED

STYLE 2:

PIN 1. COLLECTOR	5. SOURCE
2. BASE	6. DRAIN
3. EMITTER	7. GATE
4. OMITTED	8. OMITTED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.51	9.40	0.335	0.370
B	7 75	8.51	0.305	0.335
C	3.81	4.70	0.150	0.185
D	0.41	0.53	0.016	0.021
F	0.41	0.48	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.71	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	2.54 BSC		0.100 BSC	
P	–	1.27	–	0.050

CASE 655-01 TO-71

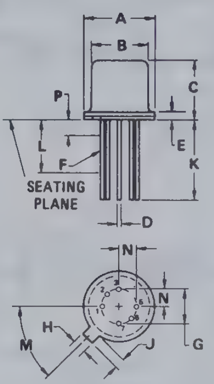

A
B
C
P
L
E
K
F
SEATING PLANE
D
N
N
H
M
J
G

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
5. EMITTER
6. BASE
7. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.45	4.95	0.175	0.195
C	4.32	5.33	0.170	0.210
D	0.41	0.53	0.016	0.021
E	–	0.76	–	0.030
F	0.41	0.48	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° BSC		45° BSC	
N	1.27 BSC		0.050 BSC	
P	–	1.27	–	0.050

All JEDEC dimensions and notes apply.

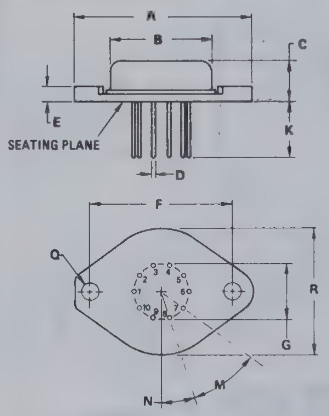
CASE 655-02


A
B
C
P
L
E
K
F
SEATING PLANE
D
N
N
H
M
J
G

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
5. EMITTER
6. BASE
7. COLLECTOR

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.31	5.84	0.209	0.230
B	4.45	4.95	0.175	0.195
C	4.32	5.33	0.170	0.210
D	0.41	0.48	0.016	0.019
G	2.54 BSC		0.100 BSC	
H	0.91	1.17	0.036	0.046
J	0.71	1.22	0.028	0.048
K	12.70	–	0.500	–
M	45° BSC		45° BSC	
N	1.72 BSC		0.050 BSC	

CASE 662-01


A
B
C
E
SEATING PLANE
K
D
F
Q
R
G
N
M

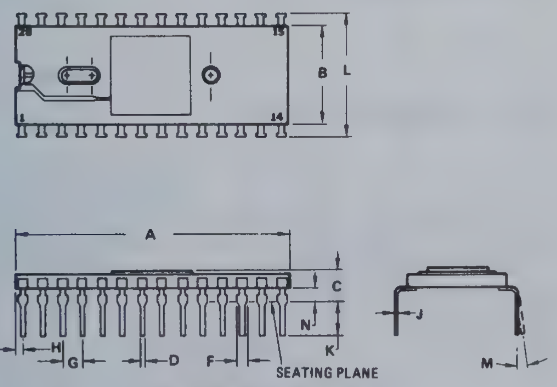
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	38.61	–	1.520
B	–	21.03	–	0.830
C	6.35	8.13	0.250	0.320
D	0.97	1.09	0.038	0 043
E	–	3.43	–	0.135
F	29 90	30.40	1.177	1.197
G	11.[illegible]4 BSC		0.470 BSC	
K	7.11	8 13	0.280	0.320
M	36° BSC		36° BSC	
N	18° BSC		18° BSC	
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050

NOTE
1. LEADS WITHIN 0.13 mm (0.005) DIA OF TRUE POSITION AT MAXIMUM MATERIAL CONDITION

STYLE 1:
PIN 1 SOURCE
2 GATE 1
3. GATE 2
4 DRAIN

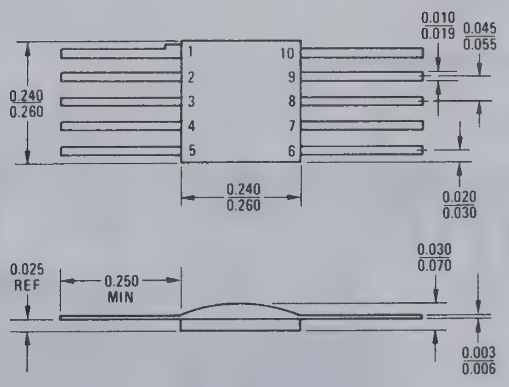
STYLE 2
PIN 1. COLLECTOR
2. BASE
3. EMITTER
4 BASE

CASE 663-02

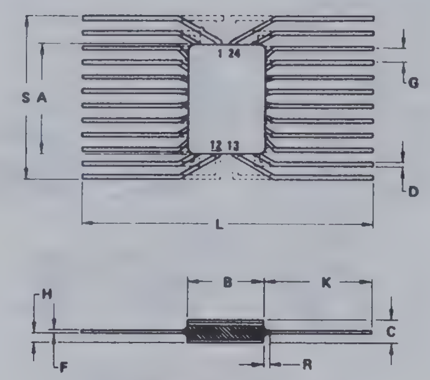

28
15
B
L
1
14
A
C
N
K
H
G
D
F
SEATING PLANE
J
M

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	34.42	35.31	1.355	1.390
B	12.45	12.95	0.490	0.510
C	2.54	3.94	0.100	0.155
D	0.38	0.51	0.015	0.020
F	1.14	1.40	0.045	0.055
G	2.54 BSC		0.100 BSC	
H	0.69	1.14	0.027	0.045
J	0.23	0.33	0.009	0.013
K	2.67	3.94	0.105	0.155
L	14.99	15.49	0.590	0.610
M	–	7°	–	7°
N	1.02	1.78	0.040	0.070

CASE 665


0.010
0.019
0.045
0.055
1
2
3
4
5
10
9
8
7
6
0.240
0.260
0.240
0.260
0.020
0.030
0.030
0.070
0.025
REF
0.250
MIN
0.003
0.006

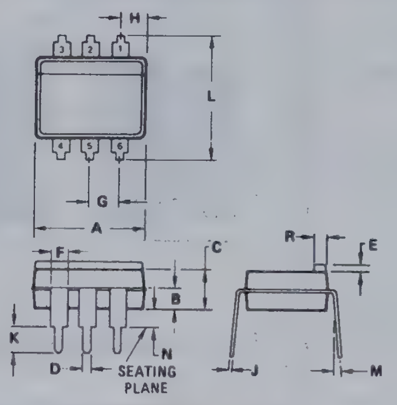
CASE 667-03



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.53	9.91	0.375	0.390
B	6.10	6.86	0.240	0.270
C	–	2.03	–	0.080
D	0.31	0.46	0.012	0.018
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.51	1.02	0.020	0.040
K	6.73	9.40	0.265	0.370
L	19.56	–	0.770	–
R	–	0.25	–	0.010
S	14.27	14.43	0.562	0.568

NOTES:
1. DIM "R" IS ALLOWABLE MENISCUS.
2. DOTTED LEAD CONFIGURATION IS OPTIONAL.

CASE 673-03



STYLE 1:
PIN 1. ANODE
2. CATHODE
3. N.C.
4. ANODE
5. CATHODE
6. N. C.

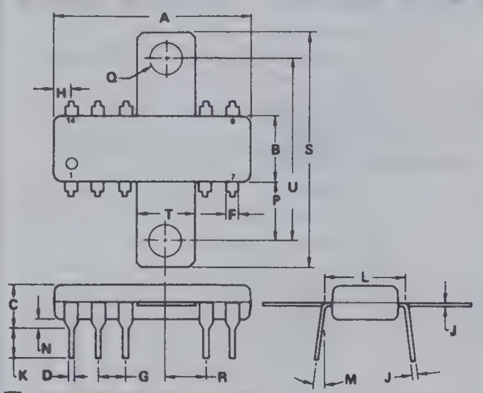
STYLE 2
PIN 1. ANODE
2. CATHODE
3. N.C.
4. EMITTER
5. COLLECTOR
6. BASE

STYLE 3:
PIN 1. ANODE
2. CATHODE
3. N.C.
4. EMITTER
5. COLLECTOR
6. N.C.

STYLE 4:
PIN 1. ANODE
2. CATHODE
3. N.C.
4. CATHODE
5. ANODE
6. GATE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.38	8.89	0.330	0.350
B	1.40	1.65	0.055	0.065
C	2.92	3.18	0.115	0.125
D	0.41	0.51	0.016	0.020
E	0.64	0.89	0.025	0.035
F	1.14	1.40	0.045	0.055
G	2.54 BSC		0.100 BSC	
H	1.57	1.83	0.062	0.072
J	0.23	0.28	0.009	0.011
K	2.54	3.30	0.100	0.130
L	7.37	7.87	0.290	0.310
M	–	5°	–	5°
N	–	1.27	–	0.050
R	1.52	1.78	0.060	0.070

CASE 675

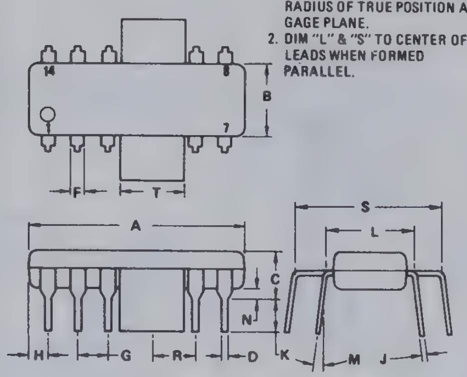


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.42	19.05	0.725	0.750
B	5.97	6.48	0.235	0.255
C	3.56	4.06	0.140	0.160
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.47	1.98	0.058	0.078
J	0.33	0.46	0.013	0.018
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	–	10°	–	10°
N	0.51	1.02	0.020	0.040
P	5.33	5.97	0.210	0.235
Q	3.05	3.30	0.120	0.130
R	3.81 BSC		0.150 BSC	
S	21.82	23.34	0.859	0.919
T	5.21	5.84	0.205	0.230
U	17.15	17.91	0.675	0.705

NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT GAGE PLANE
2. DIM "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.

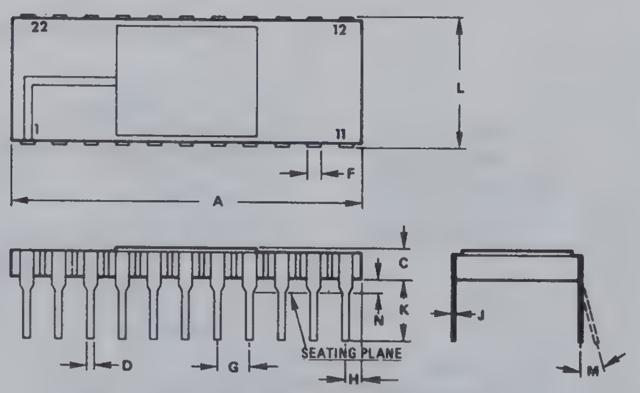
CASE 676-02

NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT GAGE PLANE.
2. DIM "L" & "S" TO CENTER OF LEADS WHEN FORMED PARALLEL.



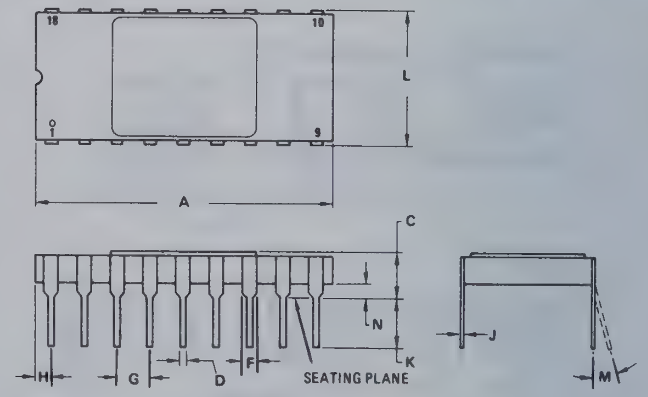
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.42	19.05	0.725	0.750
B	5.97	6.48	0.235	0.255
C	3.56	4.06	0.140	0.160
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.47	1.98	0.058	0.078
J	0.33	0.46	0.013	0.018
K	2.92	3.43	0.115	0.135
L	7.37	7.87	0.290	0.310
M	–	10°	–	10°
N	0.51	1.02	0.020	0.040
R	3.81 BSC		0.150 BSC	
S	12.45	12.95	0.490	0.510
T	5.21	5.84	0.205	0.230

CASE 677-02



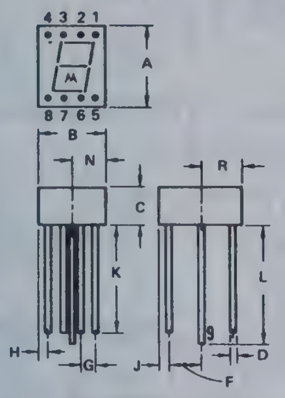
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	27.05	27.94	1.065	1.100
C	1.52	2.41	0.060	0.095
D	0.43	0.58	0.017	0.023
F	1.02 REF		0.040 REF	
G	2.54 BSC		0.100 BSC	
H	0.76	1.78	0.030	0.070
J	0.20	0.30	0.008	0.012
K	3.18	4.45	0.125	0.175
L	9.65	10.67	0.380	0.420
M	–	7°	–	7°
N	0.64	1.27	0.025	0.050

CASE 680-03



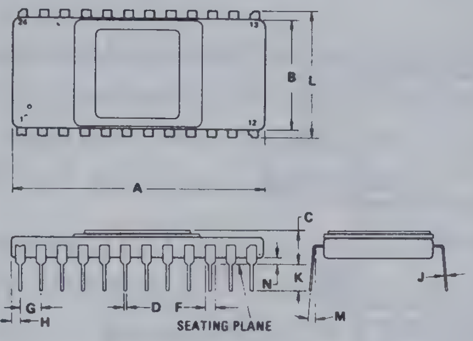
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	22.61	23.11	0.890	0.910
C	3.18	4.27	0.125	0.168
D	0.43	0.58	0.017	0.023
F	0.89	1.14	0.035	0.045
G	2.54 BSC		0.100 BSC	
H	1.14	1.40	0.045	0.055
J	0.20	0.30	0.008	0.012
K	3.56	3.68	0.140	0.145
L	7.82	7.92	0.308	0.312
M	–	10°	–	10°
N	1.02	1.52	0.040	0.060

CASE 683-01



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.73	6.99	0.265	0.275
B	5.46	5.72	0.215	0.225
C	–	3.56	–	0.140
D	0.41	0.51	0.016	0.020
F	2.54 BSC		0.100 BSC	
G	1.27 BSC		0.050 BSC	
H	0.76	0.89	0.030	0.035
J	0.89	1.02	0.035	0.040
K	8.64	9.14	0.340	0.360
L	10.16	10.41	0.400	0.410
N	2.79 BSC		0.110 BSC	
R	3.43 BSC		0.135 BSC	

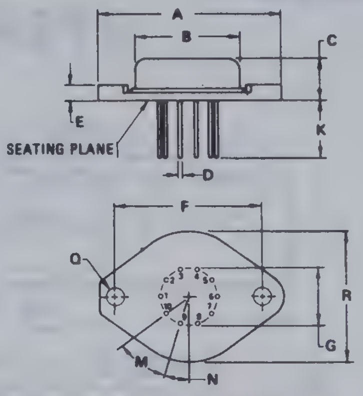
CASE 684-02



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	29.97	30.61	1.180	1.205
B	12.70	14.22	0.500	0.560
C	3.05	4.57	0.120	0.180
D	0.38	0.51	0.015	0.020
F	1.02	1.52	0.040	0.060
G	2.54 BSC		0.100 BSC	
H	1.07	1.32	0.042	0.052
J	0.20	0.30	0.008	0.012
K	2.92	4.19	0.115	0.165
L	15.19	15.80	0.598	0.622
M	–	10°	–	10°
N	0.51	1.27	0.020	0.050

NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE WITH MAXIMUM MATERIAL CONDITION.
2. LEAD NO. 1 CUT FOR IDENTIFICATION, OR BUMP ON TOP.
3. NOMINAL DIM. FROM CENTER OF LEADS PARALLEL TO DIM "L" IS 15.24 mm (0.600).

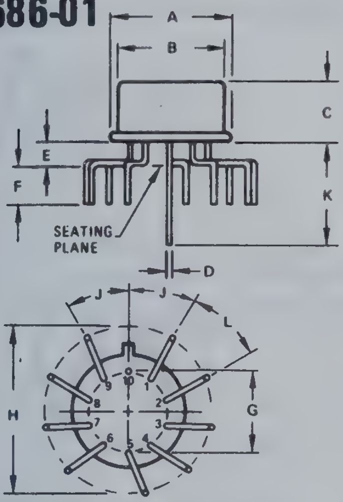
CASE 685



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	38.61	–	1.520
B	–	21.08	–	0.830
C	6.35	8.13	0.250	0.320
D	0.97	1.09	0.038	0.043
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1 197
G	11.94 BSC		0.470 BSC	
K	7.11	8.13	0.280	0.320
M	36° BSC		36° BSC	
N	18° BSC		18° BSC	
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050

(See page 9-39 for lead form availability.)

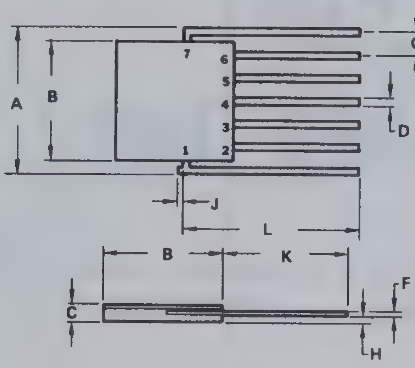
CASE 686-01



*Seven places; (between all leads except 5 & 6, 9 & 10, 10 & 1)

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.335	0.370	8.51	9.40
B	0.305	0.335	7.75	8.51
C	–	0.180	–	4.57
D	0.016	0.019	0.406	0.483
E	0.070	0.100	1.78	2.54
F	0.120	0.150	3.05	3.81
G	0.230 TP		5.84 TP	
H	0.480 TP		12.19 TP	
J	31° TP		31° TP	
K	0.235	0.265	5.97	6.73
L	34° TP		34° TP	

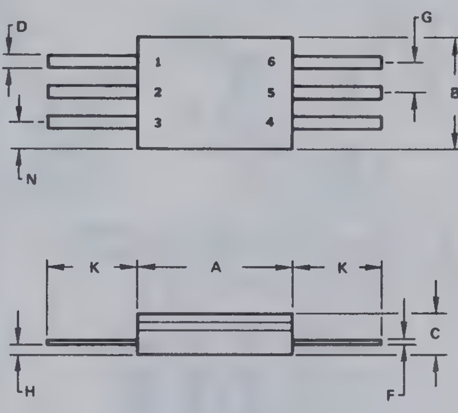
CASE 687-02



NOTES:
1. LEAD NO. 1 IDENTIFIED BY TAB (DIM "J")

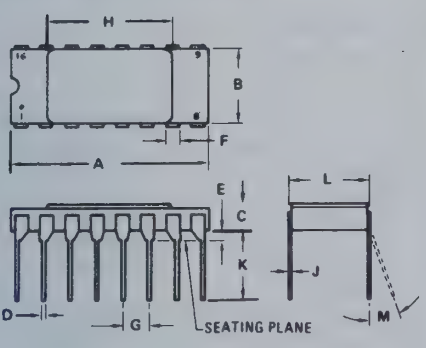
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	8.03	8.08	0.316	0.318
B	6.02	6.17	0.237	0.243
C	1.52	1.78	0.060	0.070
D	0.41	0.46	0.016	0.018
F	0.10	0.15	0.004	0.006
G	1.27 BSC		0.050 BSC	
H	–	0.64	–	0.025
J	–	0.38	–	0.015
K	1.78	–	0.070	–
L	–	12.45	–	0.490

CASE 688-02



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.97	6.60	0.235	0.260
B	–	5.08	–	0.200
C	1.17	1.91	0.046	0.075
D	0.25	0.48	0.010	0.019
F	0.08	0.15	0.003	0.006
G	1.27 BSC		0.050 BSC	
H	0.13	0.89	0.005	0.035
K	1.78	–	0.070	–
N	–	1.52	–	0.060

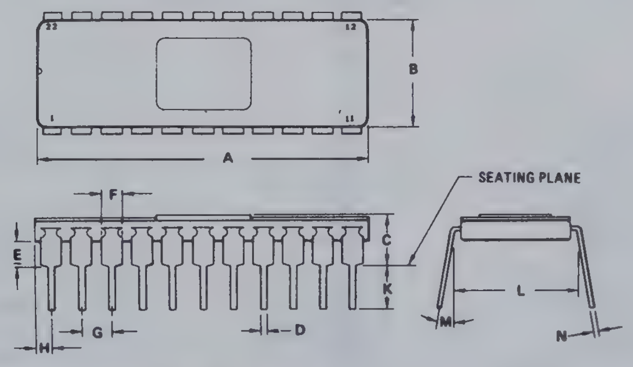
CASE 690



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.800	19.230	0.740	0.757
B	7.060	7.310	0.278	0.288
C	2.180	3.660	0.086	0.144
D	0.432	0.584	0.017	0.023
E	0.635	1 140	0.025	0.045
F	1.140	1.520	0.045	0.060
G	2.540 TP		0.100 TP	
H	11.940 REF		0.470 REF	
J	0.203	0.305	0.008	0.012
K	4.700	5.080	0.185	0.200
L	7.620 TP		0.300 TP	
M	–	10°	–	10°

NOTES:
1. DIM. "L" TO CENTER OF LEADS WHEN FORMED PARALLEL

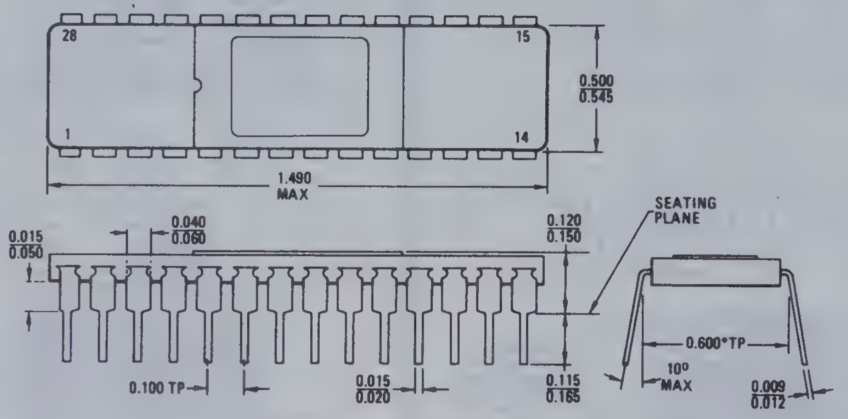
CASE 694-02



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	26.54	27.94	1.045	1.100
B	9.14	9.40	0.360	0.370
C	3.30	4.06	0.130	0.160
D	0.38	0.53	0.015	0.021
F	1.02	1.27	0.040	0.050
G	2.54 BSC		0.100 BSC	
H	0.51	1.27	0.020	0.050
J	0.23	0.30	0.009	0.012
K	2.92	3.68	0.115	0.145
L	9.91	10.67	0.390	0.420
M	3°	15°	3°	15°
N	0.51	1.27	0.020	0.050

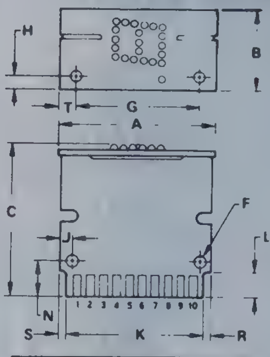
NOTES:
1. DIM "L" TO CENTER OF LEADS WHEN FORMED PARALLEL. (MEASURED 0.51 mm (0.020) FROM PKG BASE)
2. LEADS WITHIN 0.005 RADIUS OF TRUE POSITION (TP) AT SEATING PLANE WITH MAXIMUM MATERIAL CONDITION.
3. LEAD NO. IDENTIFIED BY NOTCH ON TOP

CASE 695


28
15
1
14
0.500
0.545
1.490
MAX
0.015
0.050
0.040
0.060
0.120
0.150
SEATING
PLANE
0.100 TP
0.015
0.020
0.115
0.165
0.600* TP
10°
MAX
0.009
0.012

*Dimension is to lead centerline when formed parallel
Lead number one cut for identification or marked on top

CASE 697

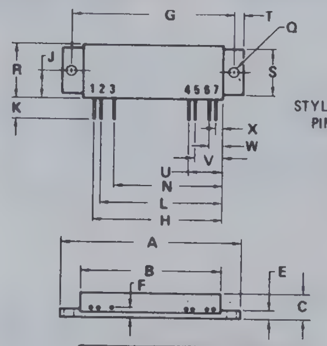

H
B
T
G
A
C
F
L
J
N
S
K
R
1 2 3 4 5 6 7 8 9 10

STYLE 1:
PIN 1. VLED
2. NC
3. LOGIC 1
4. LOGIC 2
5. GROUND
6. ENABLE
7. LOGIC 4
8. V_{CC}
9. LOGIC 8
10. DECIMAL POINT

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	52.20	52.45	2.055	2.065
B	29.08	29.34	1.145	1.155
C	41.91	44.45	1.650	1.750
F	3.05	3.30	0.120	0.130
G	35.43	35.69	1.395	1.405
H	6.10	6.60	0.240	0.260
J	3.68	4.45	0.145	0.175
K	42.04	42.29	1.655	1.665
L	7.49	7.75	0.295	0.305
N	10.29	11.05	0.405	0.435
R	2.87	3.12	0.113	0.123
S	3.23	3.48	0.127	0.137
T	8.00	8.76	0.315	0.345

NOTES:
1. PINS 1 THRU 10 FIT STANDARD 3.96 mm (0.156) EDGE CONNECTORS.
2. CIRCUIT BOARD 1.57 mm (0.062) THICK.

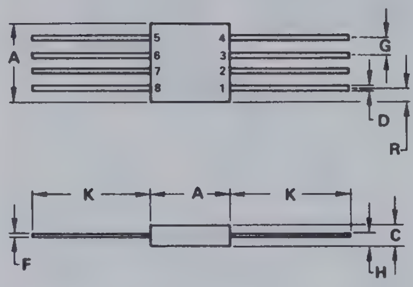
CASE 700-01


G
T
Q
J
R
S
K
1 2 3
4 5 6 7
X
W
V
U
N
L
H
A
B
F
E
C

STYLE 1:
PIN 1. RF OUTPUT
2. GROUND
3. D.C. TERM
4. GROUND
5. D.C. GAIN
6. GROUND
7. RF INPUT

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	67.18	67.44	2.645	2.655
B	52.32	52.83	2.060	2.080
C	8.64	9.65	0.340	0.380
E	2.54	3.05	0.100	0.120
F	2.16	2.41	0.085	0.095
G	60.96	61.21	2.400	2.410
H	47.88	48.64	1.885	1.915
J	10.67	11.18	0.420	0.440
K	5.84	7.62	0.230	0.300
L	45.34	46.10	1.785	1.815
N	40.26	41.02	1.585	1.615
Q	3.45	3.71	0.156	0.146
R	20.57	21.08	0.810	0.830
S	17.15	17.40	0.675	0.685
T	2.92	3.18	0.115	0.125
U	12.32	13.08	0.485	0.515
V	9.78	10.54	0.385	0.415
W	4.70	5.46	0.185	0.215
X	2.16	2.92	0.085	0.115

CASE 702-01


A
5
6
7
8
4
3
2
1
G
D
R
K
A
K
C
F
H

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.02	6.22	0.237	0.245
C	1.17	1.78	0.046	0.070
D	0.41	0.46	0.016	0.018
F	0.10	0.15	0.004	0.006
G	1.27 BSC		0.050 BSC	
H	0.38	0.76	0.015	0.030
K	6.35	6.86	0.250	0.270
R	1.09	1.22	0.043	0.048

LEADFORMS

FOR PLASTIC POWER SOCKETS

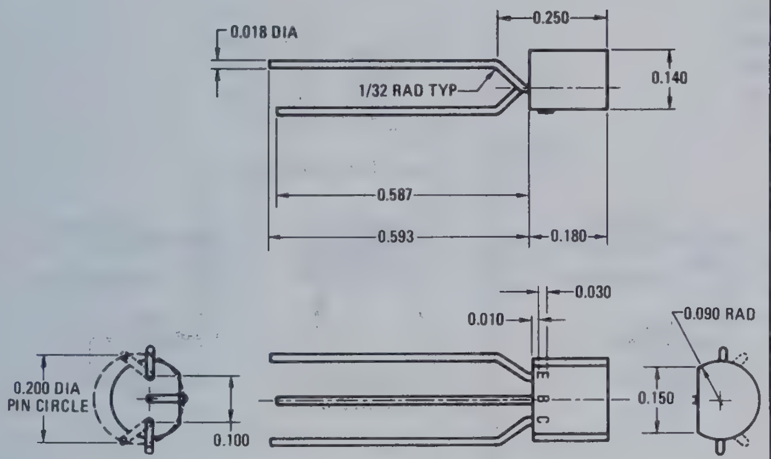
Plastic power transistors can be lead formed to a variety of configurations for insertion into sockets designed for metal-can devices. Leadform flexibility permits direct insertion into TO-66 and TO-5 sockets, or circuit-board mounting, either flat mount or flag mount.

A desired special leadform can be ordered as follows:

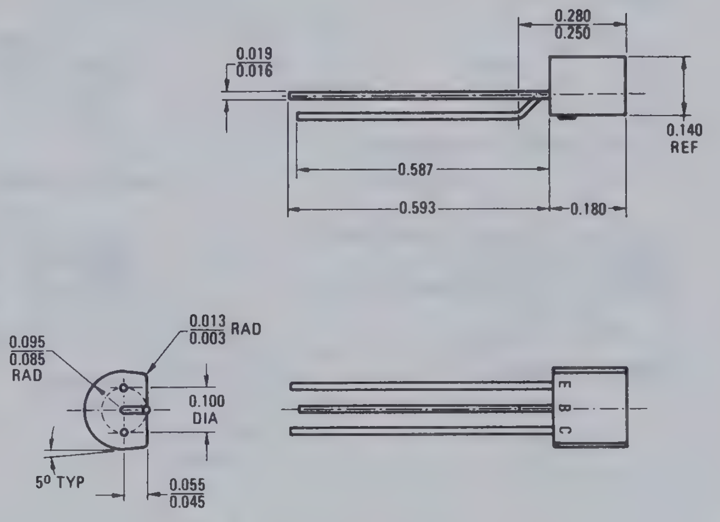
1. Select the desired transistor and case style, i.e., 2N5190 or MJE340.
2. Locate the selected case-style section in the leadform diagrams shown below.
3. Determine the leadform suffix letter (A, B, C, etc.) of the lead form required.
4. Add the lead form suffix letter to the transistor type number when placing your order. Example: 2N5190 lead form B; or MJE340 lead form A.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

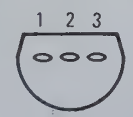
CASE 29
LEAD FORM "A"
(TO-92 TO FIT TO-5)


0.018 DIA
0.250
1/32 RAD TYP
0.140
0.587
0.593
0.180
0.030
0.010
0.090 RAD
0.200 DIA
PIN CIRCLE
0.100
E
B
C
0.150

CASE 29
LEAD FORM "B"
(TO-92 TO FIT TO-18)


0.280
0.250
0.019
0.016
0.140
REF
0.587
0.593
0.180
0.095
0.085
RAD
0.013
0.003
RAD
0.100
DIA
5° TYP
0.055
0.045
E
B
C

CASE 29 STYLES



STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 3:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 6:
PIN 1. GATE
2. SOURCE&SUBSTRATE
3. DRAIN

STYLE 7:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 8:
PIN 1. DRAIN
2. GATE
3. SOURCE & SUBSTRATE

STYLE 9:
PIN 1. BASE 1
2. EMITTER
3. BASE 2

STYLE 10:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 11:
PIN 1. ANODE
2. CATHODE & ANODE
3. CATHODE

STYLE 12:
PIN 1. ANODE 1
2. GATE
3. ANODE 2

STYLE 13:
PIN 1. ANODE 1
2. GATE
3. CATHODE 2

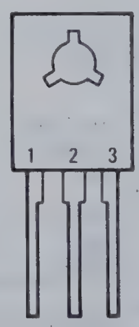
STYLE 14:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

STYLE 15:
PIN 1. ANODE 1
2. CATHODE
3. ANODE 2

STYLE 16:
PIN 1. ANODE
2. GATE
3. CATHODE

STYLE 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

CASE 77 STYLES



STYLE 1
PIN 1. EMITTER
2. COLLECTOR
3. BASE

STYLE 2
PIN 1. CATHODE
2. ANODE
3. GATE

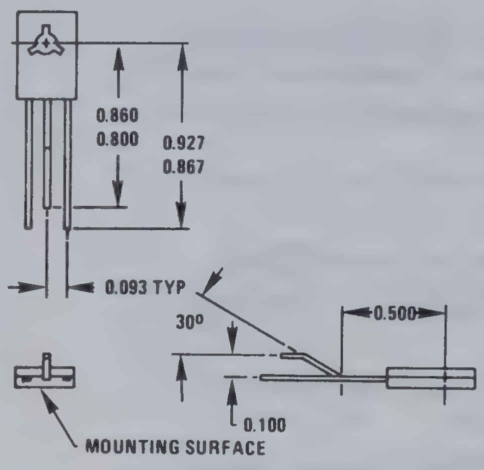
STYLE 3
PIN 1. BASE
2. COLLECTOR
3. EMITTER

STYLE 4
PIN 1. ANODE 1
2. ANODE 2
3. GATE

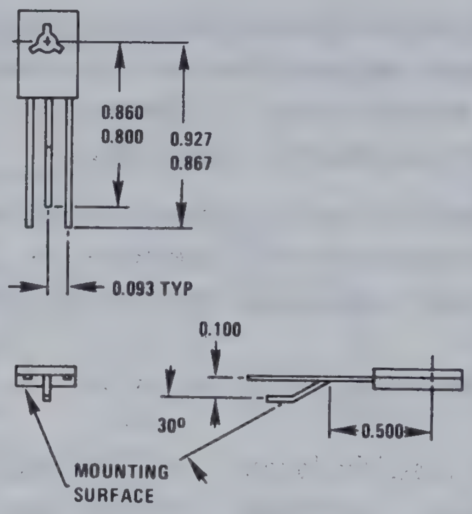
STYLE 5
PIN 1. MT1
2. MT2
3. GATE

NOTE:
1. MT = MAIN TERMINAL

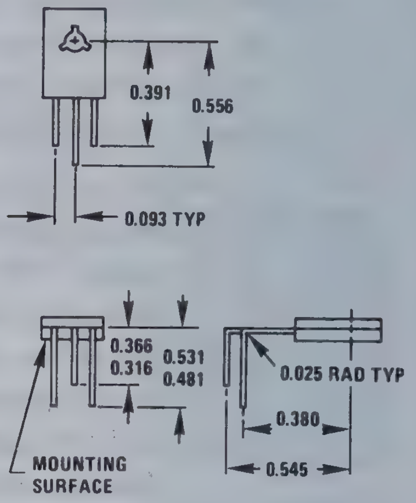
CASE 77 LEAD FORM "A"


0.860
0.800
0.927
0.867
0.093 TYP
30°
0.500
0.100
MOUNTING SURFACE

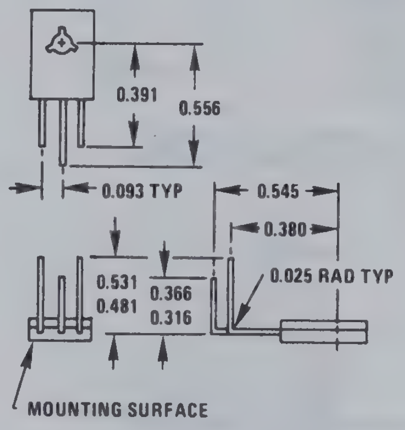
CASE 77 LEAD FORM "B"


0.860
0.800
0.927
0.867
0.093 TYP
0.100
30°
0.500
MOUNTING SURFACE

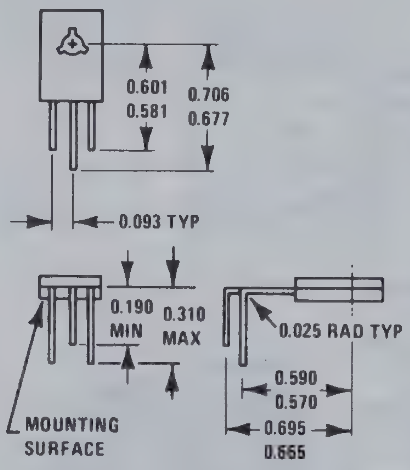
CASE 77 LEAD FORM "C"


0.391
0.556
0.093 TYP
0.366
0.316
0.531
0.481
0.025 RAD TYP
0.380
0.545
MOUNTING SURFACE

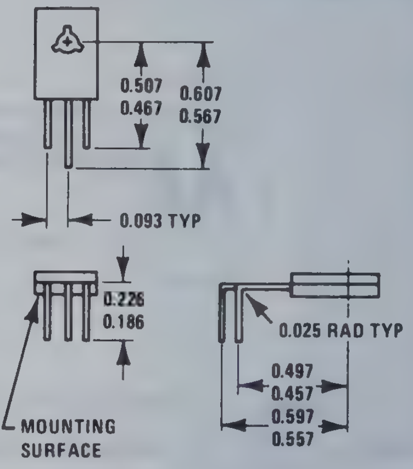
CASE 77 LEAD FORM "D"


0.391
0.556
0.093 TYP
0.545
0.380
0.531
0.481
0.366
0.316
0.025 RAD TYP
MOUNTING SURFACE

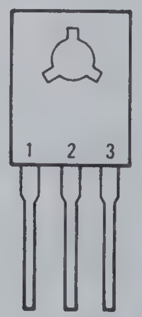
CASE 77 LEAD FORM "E"


0.601
0.581
0.706
0.677
0.093 TYP
0.190 MIN
0.310 MAX
0.025 RAD TYP
0.590
0.570
0.695
0.665
MOUNTING SURFACE

CASE 77 LEAD FORM "F"

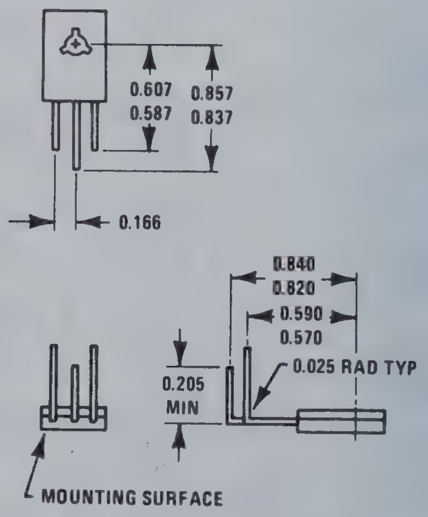

0.507
0.467
0.607
0.567
0.093 TYP
0.226
0.186
0.025 RAD TYP
0.497
0.457
0.597
0.557
MOUNTING SURFACE

CASE 90 STYLES

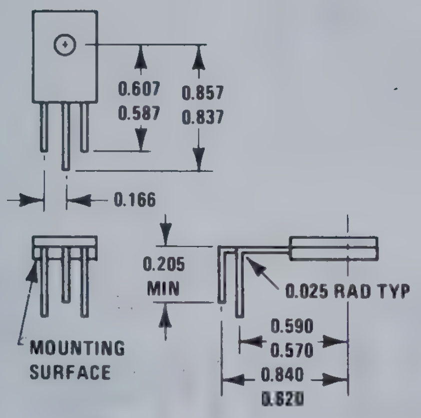


STYLE 1
  PIN 1. CATHODE
    2. ANODE
    3. GATE
STYLE 2
  PIN 1. EMITTER
    2. COLLECTOR
    3. BASE
STYLE 3
  PIN 1. CATHODE
    2. GATE
    3. ANODE
STYLE 4
  PIN 1. MT 1
    2. MT 2
    3. GATE

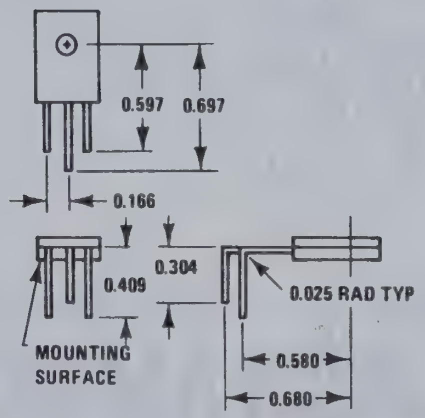
CASE 90 LEAD FORM "A"


0.607
0.587
0.857
0.837
0.166
0.840
0.820
0.590
0.570
0.025 RAD TYP
0.205 MIN
MOUNTING SURFACE

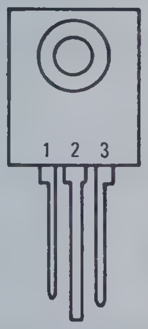
CASE 90
LEAD FORM "B"


0.607
0.587
0.857
0.837
0.166
0.205
MIN
0.025 RAD TYP
MOUNTING
SURFACE
0.590
0.570
0.840
0.820

CASE 90
LEAD FORM "C"

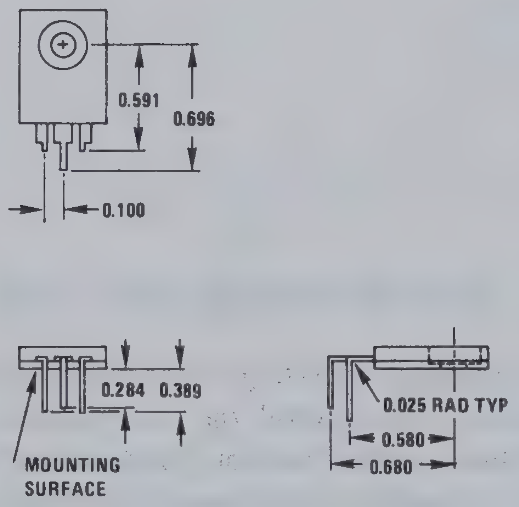

0.597
0.697
0.166
0.304
0.409
0.025 RAD TYP
MOUNTING
SURFACE
0.580
0.680

CASE 199 STYLES

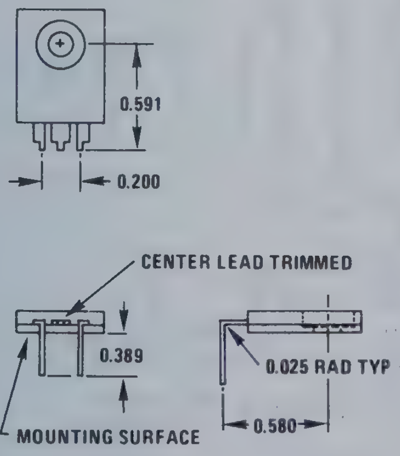


STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
STYLE 2:
PIN 1. CATHODE
2. ANODE
3. GATE
STYLE 3:
PIN 1. ANODE 1
2. ANODE 2
3. GATE

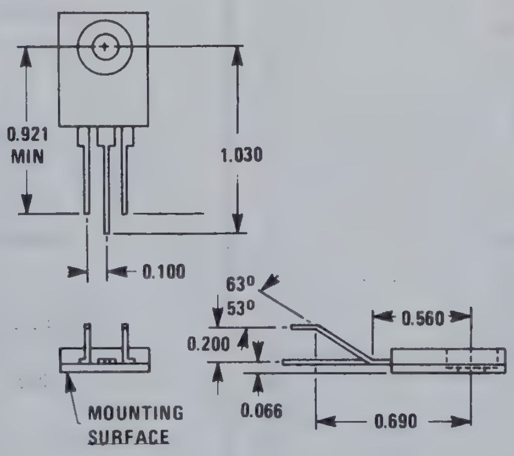
CASE 199
LEAD FORM "A"


0.591
0.696
0.100
0.284
0.389
0.025 RAD TYP
0.580
0.680
MOUNTING
SURFACE

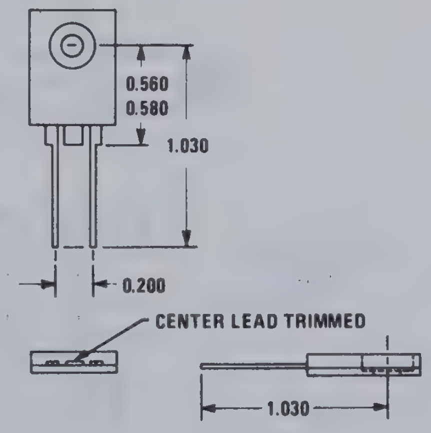
CASE 199
LEAD FORM "B"


0.591
0.200
CENTER LEAD TRIMMED
0.389
0.025 RAD TYP
MOUNTING SURFACE
0.580

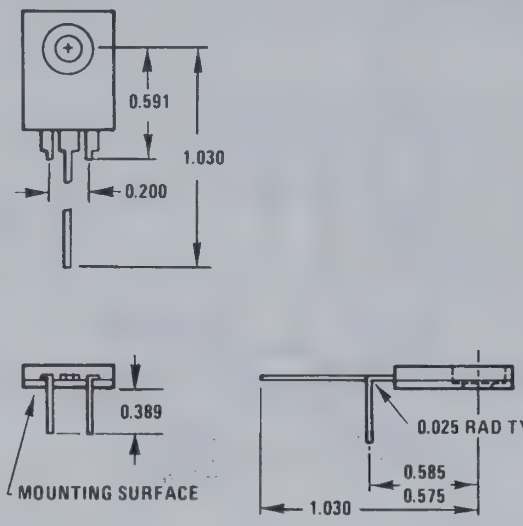
CASE 199
LEAD FORM "C"


0.921
MIN
1.030
0.100
63°
53°
0.560
0.200
MOUNTING
SURFACE
0.066
0.690

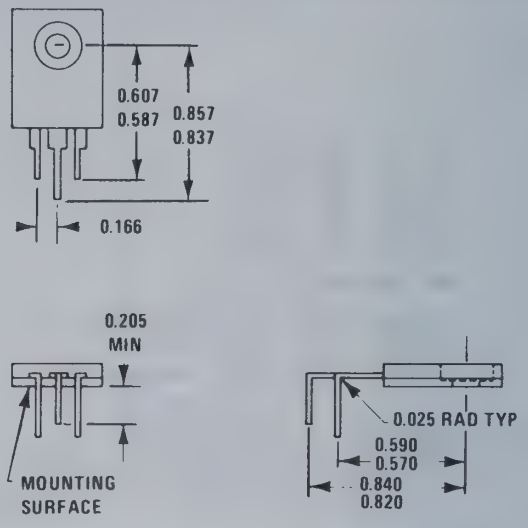
CASE 199
LEAD FORM "D"


0.560
0.580
1.030
0.200
CENTER LEAD TRIMMED
1.030

CASE 199
LEAD FORM "E"


0.591
1.030
0.200
0.389
MOUNTING SURFACE
0.025 RAD TYP
0.585
0.575
1.030

CASE 199
LEAD FORM "F"


0.607
0.587
0.857
0.837
0.166
0.205
MIN
MOUNTING
SURFACE
0.025 RAD TYP
0.590
0.570
0.840
0.820

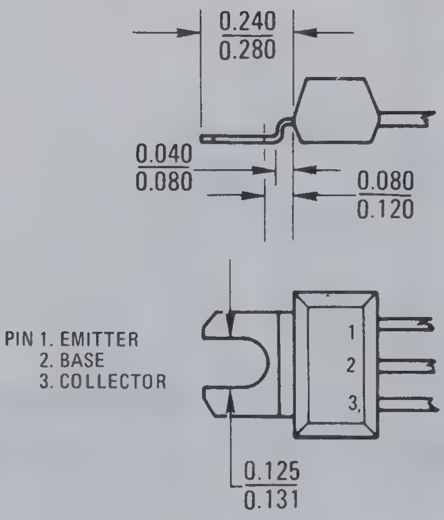
Uniwatt Package (Case 152)

This package is designed with the collector mounted on a metal tab that extends out of the plastic. The tab can be attached to a heat sink to conduct heat away from the junction.

CASE 683

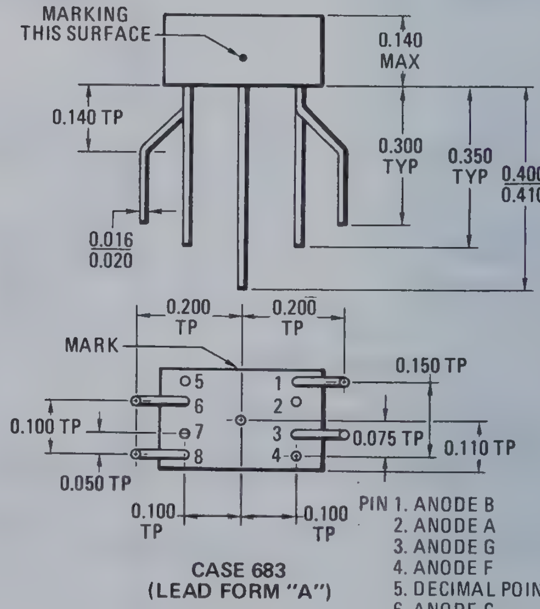
This package has lead forming to facilitate insertion into a P C board with leads on .100" centers.

CASE 152


0.240
0.280
0.040
0.080
0.080
0.120
PIN 1. EMITTER
2. BASE
3. COLLECTOR
1
2
3
0.125
0.131

Tab formed for flush mounting available on request.

CASE 683
LEAD FORM "A"


MARKING
THIS SURFACE
0.140
MAX
0.140 TP
0.300
TYP
0.350
TYP
0.400
0.410
0.016
0.020
0.200
TP
0.200
TP
MARK
5
6
7
8
1
2
3
4
0.150 TP
0.100 TP
0.075 TP
0.110 TP
0.050 TP
0.100
TP
0.100
TP

CASE 683
(LEAD FORM "A")

PIN 1. ANODE B
2. ANODE A
3. ANODE G
4. ANODE F
5. DECIMAL POINT ANODE
6. ANODE C
7. ANODE D
8. ANODE E
9. COMMON CATHODE

APPLICATION INFORMATION

Application Note Selection Guide 10–3
Application Note Abstracts 10–7

The following terms used in Motorola Application Notes are trademarks of Motorola Inc. Band-Guard ® Designers, ECONOCAP, Elf, Epic, EPICAP, MATEC, MDTL, MECL, Meg-A-Life, Meg-A-Life II, MHTL, MRTL, mW MRTL, MTTL, Multi-Cell, "0-pF", RamRod, SME, Surmetic, Thermopad, Unibloc, Uniwatt, McMOS.

APPLICATION NOTE SELECTION GUIDE

The Applications Notes listed below and described in the subsequent section, have been prepared to acquaint the circuits and systems engineer with the broad line of Motorola Semiconductor Products and their applications.

To obtain copies of these notes, simply list the AN number or numbers and send your request on your company letterhead to: Technical Information Center, Motorola Semiconductor Products Inc., P.O. Box 20912, Phoenix, Arizona 85036.

APPLICATION NOTE NUMBER	APPLICATION CATEGORY
AUDIO AMPLIFIERS	
AN-182	A Method of Predicting Thermal Stability
AN-401	The MC1554 One-Watt Monolithic Integrated Circuit Power Amplifier
AN-426A	Low Power Audio Amplifiers Using Complementary Plastic Transistors
AN-483B	20 and 30 Watt Power Amplifiers Using Darlington Output Transistors
AN-484A	Medium Power Audio Amplifiers
AN-485	High-Power Audio Amplifiers with Short-Circuit Protection
COMPUTER	
AN-245A	An Integrated Core Memory Sense Amplifier
AN-464	MTTL Designer's Note—The MC4004/MC4005, A 16-Bit Random Access Memory
AN465	MTTL Designer's Note—The MC4006/MC4007 Decoders
AN-474	The MC1541—A Gated Dual-Channel Sense Amplifier for Core Memories
AN-476	MTTL Designer's Note—The MC4000 Data Selector and the MC4002 Data Distributor
AN-487	A High-Speed Ripple-Through Arithmetic Processor
AN-488	High-Speed Addition Using Lookahead Carry Techniques
AN496A	Error Detection and Correction Using Exclusive-OR Gates and Parity Trees
AN-505	The MC4012, an MTTL 4-Bit Shift Register
AN-506	Code Conversion with Semiconductor Read Only Memories
AN-528	Binary-to-BCD and BCD-to-Binary Conversion with Complex IC Functions
AN-530A	The MC7491A Eight-Bit Serial Shift Register and the MC7495 Four-Bit Shift Register
AN-533	Semiconductors for Plated-Wire Memories
AN-547	A High Speed Dual Differential Comparator, the MC1514
AN-550	Programming the MCM5003/5004 Programmable Read Only Memory
AN-573	Engineering Report: A Comparison Between MECL 10,000 and Schottky TTL Minicomputer Designs
AN-576	The Logical Design of Shift Counters
AN-700	Simulate MECL System Interconnections With a Computer Program
DIGITAL LOGIC CIRCUITS	
MDTL	
AN-408	Problems and Solutions with MDTL and MRTL
AN-487	A High-Speed Ripple-Through Arithmetic Processor

APPLICATION NOTE NUMBER	APPLICATION CATEGORY
AN-496A	Error Detection and Correction Using Exclusive-OR Gates and Parity Trees
AN-519	Using MDTL Logic Blocks
MECL	
AN-194A	Designing Integrated Serial Counters
AN-270	Nanosecond Pulse Handling Techniques
An-417	IC Crystal Controlled Oscillators
AN-418	High Speed Monostable Multivibrator Design with MECL Integrated Circuits
AN-456	A 50 MHz Programmable Counter Designed with MECL II Integrated Circuits
AN-488	High-Speed Addition Using Lookahead Carry Techniques
An-496A	Error Detection and Correction Using Exclusive-OR Gates and Parity Trees
AN-504	The MC1600 Series MECL III Gates
AN-532A	MTTL and MECL Avionics Digital Frequency Synthesizer
AN-534	Commutating Filter Techniques
AN-536	Micro-T Packaged Transistors for High Speed Logic Systems
AN-556	Interconnection Techniques for Motorola's MECL 10,000 Series Emitter Coupled Logic
AN-565	Using Shift Registers as Pulse Delay Networks
AN-566	High Speed Binary Multiplication Using the MC10181
AN-567	MECL Positive and Negative Logic
AN-572	Initial Reliability Report for MECL10,000 Integrated Logic Circuits
AN-573	Engineering Report: A Comparison Between MECL 10,000 and Schottky TTL Minicomputer Designs
AN-579	Testing MECL 10,000 Integrated Logic Circuits
AN-581	An MSI 500 MHz Frequency Counter Using MECL and MTTL
AN-583	A MECL 10,000 Main Frame Memory Employing Dynamic MOS RAMS
AN-584	Programmable Counters Using the MC10136 and MC10137 MECL 10,000 Universal Counters
AN-586	Measure Frequency and Propagation Delay with High Speed MECL Circuits
AN-592	AC Noise Immunity of MECL 10,000 Integrated Circuits
AN-700	Simulate MECL System Interconnections With a Computer Program
AN-701	Understanding MECL 10,000 DC and AC Data Sheet Specifications
MHTL	
AN-298	Noise Immunity with High Threshold Logic
AN-414	Operations and Application of MHTL IC Flip-Flops

APPLICATION NOTE SELECTION GUIDE (continued)

APPLICATION NOTE NUMBER	APPLICATION CATEGORY
AN-467	Using Motorola High Threshold Logic
AN-524	Converting Relay Control Systems to Digital ICs
MRTL	
AN-251A	Decade Counters Using MRTL Integrated Circuits
AN-408	Problems and Solutions with MDTL and MRTL
AN-451	A Frequency Counter Using Motorola RTL Integrated Circuits
MTTL	
AN-270	Nanosecond Pulse Handling Techniques
AN-464	MTTL Designer's Note—The MC4004/MC4005, A 16-Bit Random Access Memory
AN-465	MTTL Designer's Note—The MC4006/MC4007 Decoders
AN-476	MTTL Designer's Note—The MC4000 Data Selector and the MC4002 Data Distributor
AN-488	High-Speed Addition Using Lookahead Carry Techniques
AN-492	Operating Characteristics of Motorola MC3000/MC3100 Series Transistor-Transistor Logic Gates
AN-493	The MC3000/MC3100 Series Transistor-Transistor Logic Flip-Flops
AN-496A	Error Detection and Correction Using Exclusive-OR Gates and Parity Trees
AN-505	The MC4012, an MTTL 4-Bit Shift Register
AN-506	Code Conversion with Semiconductor Read Only Memories
AN-528	Binary-to-BCD and BCD-to-Binary Conversion with Complex IC Functions
AN-530A	The MC7491A Eight-Bit Serial Shift Register and the MC7495 Four-Bit Shift Register
AN-532A	MTTL and MECL Avionics Digital Frequency Synthesizer
AN-534	Commutating Filter Techniques
AN-537	The MC4023, an MTTL 4-Bit Universal Counter
AN-541	Medium Scale Integration in the Numerical Control Field
AN-550	Programming the MCM5003/5004 Programmable Read Only Memory
AN-573	Engineering Report: A Comparison Between MECL 10,000 and Schottky TTL Minicomputer Designs
AN-577	Design Techniques for an 80 Watt, 175 MHz Transmitter for 12.5 Volt Operation
AN-578	UHF Microstrip Amplifiers Utilizing G-10 Epoxy-Glass Laminate
AN-581	An MSI 500 MHz Frequency Counter Using MECL and MTTL
MOS	
AN-523	MOS Multiplex Switches
AN-538A	Motorola Complementary MOS Integrated Circuits
AN-558	CRT Display with Dynamic MOS RAM Storage
AN-562	MOS Dynamic RAMS in Memory Systems
AN-574	CMOS: A New Logic Type for Control Systems
AN-583	A MECL 10,000 Main Frame Memory System Employing Dynamic MOS RAMS

APPLICATION NOTE NUMBER	APPLICATION CATEGORY
AN-591	Using McMOS in Systems Designs — Those All-Important Details
FET	
AN-211A	Field-Effect Transistors in Theory and Practice
AN-219	The Field-Effect Transistor in Digital Applications
AN-220	FET's in Chopper and Analog Switching Circuits
AN-231	FET Differential Amplifier
AN-455	Using the FET Designers Data Sheet for Worst Case Amplifier Circuit Design
AN-462	FET Current Regulators—Circuits and Diodes
AN-511	Low Frequency Applications of Field-Effect Transistors
INSTRUMENTATION & CONTROL	
AN-220	FET's in Chopper and Analog Switching Circuits
AN-221	4-Layer and Current-Limiter Diodes Reduce Circuit Cost and Complexity
AN-231	FET Differential Amplifier
AN-261A	Transistor Logarithmic Conversion Using an Operational Amplifier
AN-437A	Design Considerations and Performance of Motorola Temperature-Compensated Zener Reference Diodes
AN-451	A Frequency Counter Using Motorola RTL Integrated Circuits
AN-470	Bipolar Chopper Transistors and Circuits
AN-471	Analog-to-Digital Conversion Techniques
AN-489	Analysis and Basic Operation of the MC1595
AN-510A	A Function Generator
AN-524	Converting Relay Control Systems to Digital ICs
AN-534	Commutating Filter Techniques
AN-540	A Synchronously Gated N-Decade Sweep Oscillator
AN-541	Medium Scale Integration in the Numerical Control Field
AN-552	The Control Engineer's Guide to IC Applications
AN-557	Analog-to-Digital Cyclic Converter
AN-559	Simple RAMP A/D Converter
AN-574	CMOS: A New Logic Type for Control Systems
AN-581	An MSI 500 MHz Frequency Counter Using MECL and MTTL
AN-582	An Introduction to Using the MCBH7601 Crosspoint Switch
AN-586	Measure Frequency and Propagation Delay with High Speed MECL Circuits
AN-589	Generate Custom Waveforms Digitally
MEMORIES, SOLID STATE	
AN-464	MTTL Designer's Note—The MC4004/MC4005, A 16-Bit Random Access Memory
AN-506	Code Conversion with Semiconductor Read Only Memories
AN-550	Programming the MCM5003/5004 Programmable Read Only Memory
AN-558	CRT Display with Dynamic MOS RAM Storage
AN-562	MOS Dynamic RAMS in Memory Systems

APPLICATION NOTE SELECTION GUIDE (continued)

APPLICATION NOTE NUMBER	APPLICATION CATEGORY
AN-583	A MECL 10,000 Main Frame Memory System Employing Dynamic MOS RAMS
OPERATIONAL AMPLIFIERS	
AN-204A	High Performance Integrated Operational Amplifiers
AN-248	The MC1533 Voltage Monolithic Operational Amplifier
AN-273A	More Value out of Integrated Operational Amplifier Data Sheets
AN-403	Single Power Supply Operation of IC Op Amps
AN-407	A General Purpose IC Differential Output Operational Amplifier
AN-411	The MC1535 Monolithic Dual Op Amp
AN-439	MC1539 Op Amp and its Applications
AN-459	A Simple Technique for Extending Op Amp Power Bandwidth
AN-522	The MC1556 Operational Amplifier and its Applications
AN-587	Analysis and Design of the Op Amp Current Source
OPTOELECTRONICS	
AN-440	Theory and Characteristics of Phototransistors
AN-508	Applications of Phototransistors in Electro-Optic Systems
AN-561	How to Use Photosensors and Light Sources
AN-571	Isolation Techniques Using Optical Couplers
AN-598	Four Terminal, Optically Isolated Zero Crossing AC Relay
POWER CONTROL	
AN-140	Characterization of SCR's as Switches for Line Type Modulators
AN-189	Solid-State Pulse Width Modulation DC Motor Control
AN-240	SCR Power Control Fundamentals
AN-268	Pulse Triggering of Radar Modulator SCR's
AN-295	Suppressing RFI in Thyristor Circuits
AN-413	Unijunction Trigger Circuits for Gated Thyristors
AN-436	Conventional and Soft-Start Dimming of Incandescent Lights
AN-441	SCR Slaving Circuits
AN-443	Directional and Speed Control for Series, Universal and Shunt Motors
AN-445	Pulse-Width Modulation for DC-Motor Speed Control
AN-450	Induction Motor Speed Control
AN-453	Zero Point Switching Techniques
AN-466	Circuit Applications for the Triac
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APPLICATION NOTE ABSTRACTS

AN-139A Understanding Transistor Response Parameters

This note explains high-frequency transistor response parameters and discusses their interdependence. Useful nomograms are given for determining h_{fe}, f_T, $f_{\alpha e}$, f_{max}, and many other parameters.

AN-140 Characterization of SCR's as Switches for Line Type Modulators

Although Silicon Controlled Rectifiers are highly desirable as switches in DC pulse circuits, they are usually specified and characterized for AC applications only. This article discusses the SCR characteristics desirable for DC pulse applications, and proposes simple test circuits for evaluating such devices as pulse circuit switches. A device already characterized for such applications is described.

AN-147 High-Power Varactor Diodes: Theory and Application

This article treats varactors in non-rigorous terms, discussing what they are, how they work, and how to use them in practical high-power, high-frequency, output circuits.

AN-151 Charge Storage Varactors for Extra UHF Power

This report describes a varactor multiplier which may be used to achieve power outputs of more than 50 Watts at 150 MHz, and 20 Watts at 450 MHz. With such high-frequency capabilities, transistor-varactor combinations can replace triodes and klystrons in many UHF and microwave applications.

AN-159 Design Tips for Coaxial-Cavity Varactor Multipliers

Most microwave engineers picture a coaxial cavity as a bulky construction, difficult to design easily. This report demonstrates that varactor multipliers can easily be designed as small as any other. Design principles and operational data for 500 MHz - 1000 MHz doublers are given.

AN-166 Using Linvill Techniques for RF Amplifiers

A design procedure, derived from theory developed by J. G. Linvill, simplifies the design of single stage small-signal RF amplifiers. A 200 MHz amplifier serves as an example of the technique.

AN-176 Power Varactor Gives 5 Watts Output at 3 GHz

A discussion of the design and performance of the high power 1N5151-53 varactors, including design details of a 1 GHz to 2 GHz frequency doubler and a 1 GHz to 3 GHz tripler.

AN-177 Two Stage Varactor Multiplier Provides High Power at 400 MHz

This "times-eight" frequency multiplier can provide a nominal 40 Watts of CW power at an output frequency of 400 MHz with a conversion efficiency of 30 percent.

AN-178A Epicap Tuning Diode Theory and Applications

General electronic-tuning considerations are discussed, including important parameters such as Q, tuning range, and temperature stability.

AN-182 A Method of Predicting Thermal Stability

Variations in DC bias current with temperature is an important consideration in the design of reliable transistor audio amplifiers. This note gives a useful method of predicting the thermal stability of biasing circuits.

AN-189 Solid-State Pulse Width Modulation DC Motor Control

Pulse-width modulation, an effective method of DC voltage control, provides motor speed regulation under varying torque conditions - ideal for traction drive vehicles.

AN-194A Designing Integrated Serial Counters

MECL monolithic integrated J-K flip-flops serve as building blocks for ultra-high-speed ripple counters. General design techniques for designing counters of any arbitrary count.

AN-204A The MC1530, MC1531 Integrated Operational Amplifiers

Two new high performance monolithic operational amplifiers feature exceptionally high input impedance and high open loop gain. This note describes the function of each stage in the circuit, methods of frequency compensating and DC biasing. Four applications are discussed: a summing circuit, an integrator, a DC comparator, and transfer function simulation.

AN-210 FM Modulation Capabilities of Epicap VVC's

The author shows by empirical methods that the frequency vs. voltage curve for Epicap voltage variable capacitors is linear for small (sufficient for most FM modulator applications) voltage variations.

A rigorous mathematical explanation of this linear interdependence follows the empirical demonstration.

AN-211A Field-Effect Transistors in Theory and Practice

The basic theory, construction, and application information for field-effect transistors (junction and MOS types) are given. Also included are some typical test circuits for checking FET parameters.

AN-213 Varactor Multipliers Provide High Output Power Above 6 GHz

The author employs a high-performance varactor diode in the design of several multiplier circuits which feature exceptionally high output-power versus frequency capabilities. Among the circuits discussed are a 2 to 4 GHz doubler, a 2 to 6 GHz tripler, a 2.83 to 8.5 GHz tripler, and a 500 MHz to 4 GHz one-step multiplier.

AN-215A RF Small-Signal Design Using 2-Port Parameters

Power gain and stability of high-frequency transistors may be completely described by two port parameters.

This paper presents a summary of the overall design solution for the small-signal RF amplifier using two-port parameters. Design considerations and relationships for both the stable and the potentially unstable transistor are presented together with a discussion of neutralized, unneutralized, matched, and mismatched amplifiers.

AN-219 The Field-Effect Transistor in Digital Applications

Field-effect transistors have definite advantages over junction transistors in many digital applications; high fan-out, direct coupled circuitry (lower component count), extremely low power dissipation, and low temperature coefficient circuits are among the most important.

This paper provides the designer with an up-to-date discussion of JFET and MOSFET switching characteristics and how they are used in the design of basic digital circuits. The final portion of this paper discusses a family of JFET logic circuits, a family of MOSFET, and future prospects.

AN-220 FET's in Chopper and Analog Switching Circuits

The author's discussion begins with elementary chopper and analog switch characteristics—explores fully the considerations required for conventional and FET chopper and analog switch design—and finishes with specific FET circuit examples.

AN-221 4-Layer and Current-Limiter Diodes Reduce Circuit Cost and Complexity

The authors present four simple circuits in which 4-layer diodes and current-limiter diodes are used to provide increased circuit performance: A Saw-tooth generator (two variations), a staircase generator and a ring counter.

A brief discussion of the electrical characteristics of 4-layer and field-effect diodes precedes the circuit examples.

AN-222 The ABCs of Solid-State DC to AC Inverters

The author provides a comprehensive examination of the entire field of DC to AC inverters. Among the topics discussed are: the proper inverter for a specific application; operation principles of different types of inverters; the problem of proper device selection in the design of inverters; an inverter design example.

AN-226 Thermal Measurements on Semiconductors

This note describes the techniques used by Motorola to obtain the thermal resistance of transistors, rectifiers, and thyristors.

AN-228 20 Watts at 1 GHz with Step Recovery Varactors

Varactor harmonic multiplier circuit power handling capabilities have now been extended to 20 Watts at 1 GHz and 10 Watts at 2 GHz by two new varactors, the 1N5149 and 1N5150. This note provides a complete discussion of the design and performance of these two varactors. Several high performance multiplier circuits: - a 0.5 GHz to 1 GHz doubler; a 0.4 GHz to 1.2 GHz tripler; and a 0.46 GHz to 1.84 GHz quadrupler are also discussed.

AN-231 FET Differential Amplifier

The field-effect transistor is often a better choice than the bipolar transistor in many differential amplifier applications, particularly when high input impedance is required. This report discusses drift compensation of field-effect transistors for differential amplifier applications.

AN-232 1.5 GHz 10 Watt Two-Stage Cascade Multiplier

Two high-performance varactors—the 1N5149 and 1N5150—are employed in a cascade multiplier which features over 10 watts power output at 1.5 GHz.

AN-238 Transistor Mixer Design Using 2-Port Parameters

Mixer circuit design may be simplified by the use of small-signal admittance parameters. This note describes in detail the effective application of this design technique and the corresponding results. Several design examples are discussed.

AN-240 SCR Power Control Fundamentals

Relationships of control angle to peak voltage, average voltage, RMS voltage and power are presented in chart form. Time constant for relaxation oscillators are discussed for both DC and AC supplies. These basics form the heart of SCR control.

AN-245A An Integrated Core Memory Sense Amplifier

This application note discusses core memories and related design considerations for a sense amplifier. Performance and environmental specifications for the amplifier design are carefully established so that the circuit will work with any computer using core memories. The final circuit design is then analyzed and measured performance is discussed. The amplifier features a small uncertainty region (6 mV max), adjustable voltage gain, and fast cycle time (0.5 μs).

AN-247A An Integrated Circuit RF-IF Amplifier

A new, versatile integrated circuit for RF-IF applications is introduced which offers high gain, extremely low internal feedback and wide AGC range. The circuit is a common-emitter, common-base pair (the cascade connection) with an AGC transistor and associated biasing circuitry. The amplifier is built on a very small die and is economically comparable to a single transistor, yet it offers performance advantages unobtainable with a single device. This application note describes the AC and DC operation of the circuit, a discussion of Y-parameters for calculating optimum power and voltage gain, and a variety of applications as an IF single-tuned amplifier, IF stagger-tuned amplifier, oscillator, video-audio amplifier and modulator. A discussion of noise figure is also included.

AN-248 The MC1533 Monolithic Operational Amplifier

This note introduces a high voltage monolithic operational amplifier featuring high open loop gain, large common mode input signal, and low drift. The function of each stage in the circuit is analyzed, and methods for frequency compensating the amplifier are discussed. DC biasing parameters are also examined. Four applications using the amplifier are discussed: a source follower, a twin tee filter and oscillator, a voltage regulator, and a high input impedance voltmeter.

AN-249 Designing Around the Tuning Diode Inductance

The effect of varactor inductance is described, and equations and graphs are presented in order to predict the inductance value and to determine when its effects on performance is significant.

In addition, a design example of a varactor-tuned capacity-loaded half-wave cavity from 470 MHz to 890 MHz, and derivations of design equations for varactor tuned quarter wave and half-wave cavities as well as for lumped series tuned circuits are shown.

AN-251A Decade Counters Using MRTL Integrated Circuits

This application note discusses the design and implementation of decade counters using the MRTL family of integrated logic. Ripple counters, shift counters, and parallel clocked counters are developed using BCD, 2'421, and excess 3 digital codes. Up and down counting techniques are discussed. Output decoding, problem areas and circuit limitations are covered for all counter types.

AN-260 Selecting Varactor Diodes

High output power in the UHF region can be achieved with varactors. A device selection procedure based on experience, theory and common sense is offered.

AN-261A Transistor Logaritmic Conversion Using an Operational Amplifier

The design of a log amplifier using a common base transistor configuration as the feedback element of an integrated circuit operational amplifier circuit is discussed in this application note. Six decades of logarithmic conversion are obtained with less than 1% error of output voltage. The possible causes of error are discussed followed by two applications: direct multiplication of two numbers, and solution of the equation $Z = X^n$.

AN-267 Matching Network Designs with Computer Solutions

Computer solutions for four networks commonly used in solid-state high frequency amplifiers have been tabulated.

AN-268 Pulse Triggering of Radar Modulator SCR's

Factors involved in dynamic gate triggering are examined and relations of gate triggering characteristics to variations of total current amplifications with gate current are shown.

AN-270 Nanosecond Pulse Handling Techniques In IC Interconnections

The rapid advancement in the field of high speed digital integrated circuits has brought into focus many problem areas in the methods of pulse measurement techniques and new concepts dealing with these problems. This paper is intended to discuss the more common, yet perhaps not well known, pitfalls of measurement systems, a method of detecting them and possible solutions.

AN-273A More Value out of Integrated Operational Amplifier Data Sheets

The operational amplifier is rapidly becoming a basic building block in present day solid state electronic systems. The purpose of this application note is to provide a better understanding of the open loop characteristics of the amplifier and their significance to overall circuit operation. Also, each parameter is defined and reviewed with respect to closed loop considerations. The importance of loop gain stability and bandwidth is discussed at length. Input offset circuits are also reviewed with respect to closed loop operation.

AN-282A Systemizing RF Power Amplifier Design

The design of high-power, Class C, RF transistor amplifiers can be greatly simplified through the use of large-signal device characterization. This note explains design procedures and furnishes large-signal impedance data for eight Motorola RF power transistors.

AN-287 Color IF Amplifier and AGC Circuit

A non-neutralized, three-stage IF video amplifier is described. Included is the associated keyed AGC circuitry. The circuits were used in a transistorized color set built in the Applications Laboratory at Motorola.

AN-290B Mounting Procedure for, and Thermal Aspects of, Thermopad Plastic Power Devices

Many Motorola power devices are now available in the Plastic Thermopad packages. Three package types are presently available. This application note provides information concerning the handling and mounting of these packages, as well as information on some thermal aspects.

AN-293 Theory and Characteristics of the Unijunction Transistor

This note discusses the theory of operation, the important characteristics and the behavior of the unijunction transistor under several operating conditions. In addition, a comparison is made between the different fabrication methods used to construct the UJT. Included is a table explaining UJT nomenclature.

AN-294 Unijunction Transistor Timers and Oscillators

Twelve different unijunction transistor circuits, complete with parts lists are given. Temperature stabilization of the peak-point voltage is examined and dynamic operation paths are discussed.

AN-295 Suppressing RFI in Thyristor Circuits

Measures taken to suppress RFI are shown. Design considerations and examples are explored as well as some solutions to the RFI problem.

AN-298 Noise Immunity with High Threshold Logic

A comparison of noise immunity characteristics is made between MHTL devices and standard saturated logic devices.

AN-299 An IC Wideband Video Amplifier with AGC

This application describes the use of the MC1550 as a wideband video amplifier with AGC. The analysis of a single stage amplifier with 28 dB of gain and 22 MHz bandwidth is given with the results extended to a 78 dB video amplifier with 10 MHz bandwidth.

AN-401 The MC1554 One-Watt Monolithic Integrated Circuit Power Amplifier

This application note discusses four different applications for the MC1554, along with a circuit description including DC characteristics, frequency response, and distortion. A section of the note is also devoted to package power dissipation calculations including the use of the curves on the power amplifier data sheet.

AN-403 Single Power Supply Operation of IC Op Amps

A split zener biasing technique that permits use of the MC1530/1531, MC1533, and MC1709 operational amplifiers and their restricted temperature counterparts MC1430/1431, MC1433 and MC1709C from a single power supply voltage is discussed in detail. General circuit considerations as well as specific AC and DC device considerations are outlined to minimize operating and design problems.

AN-404 A Wideband Monolithic Video Amplifier

This note describes the basic principles of AC and DC operation of the MC1552G and MC1553G, characteristics obtained as a function of the device operating modes, and typical circuit applications.

AN-406A UHF Broadband Amplifier Design

A design technique is given for a wideband amplifier operating at UHF frequencies. A shunt-shunt feed-back network and Y-parameters at sampled frequencies are used.

AN-407 A General Purpose IC Differential Output Operational Amplifier

This application note discusses four different applications for the MC1520 and a complete description of the device itself. The final sections of the note discuss such topics as operation from single and split power supplies, frequency compensation, and various feedback schemes.

AN-408 Problems and Solutions With MDTL and MRTL

Problems which may be encountered in using MRTL or MDTL integrated circuits in low or medium speed systems are examined in this report. Methods of shaping clock waveforms, restrictions on input and output terminals when interfacing with discrete components, and techniques for extending temperature range are discussed.

AN-411 The MC1535 Monolithic Dual Op Amp

This note discusses two dual operational amplifier applications and an input compensation scheme for fast slew rate for the MC1535. A complete AC and DC circuit analysis is presented in addition to many of the pertinent electrical characteristics and how they might affect the system performance.

AN-412 Duplexing with Step Recovery Varactors

The switching function in a duplexer circuit can be performed automatically by a step recovery varactor, eliminating the need for an external bias circuit. In this note, two CW duplexers are described: a 133 MHz lumped constant component duplexer and a 450 MHz microstrip transmission line duplexer.

AN-413 Unijunction Trigger Circuits for Gated Thyristors

This note describes the methods of supplying controlled pulse widths in synchronization with the AC power line to gated thyristors. The unijunction transistor provides a simple and convenient means of obtaining such pulses as well as including feedback with very little additional circuitry.

AN-414 Operation and Application of MHTL IC Flip-Flops

A master-slave R-S and a dual J-K are the initial flip-flop elements available in the Motorola High Threshold Logic (MHTL) family. This note describes operation and characteristics of each unit and illustrates several applications of these devices.

AN-415A Avoiding Second Breakdown

The use of safe-area data, the physical mechanism of second breakdown and applications to various circuits are presented. Also included is a short discussion of test procedures and a typical test circuit used to establish safe area curves.

AN-416 One-Step High Order Frequency Multipliers

The circuits described in this report include the use of lumped constants, coaxial cavities, and waveguides. The design of lumped constant, low order multipliers is discussed in Application Notes AN-147 and AN-151 and coaxial cavity multiplier design is treated in Note AN-159. Therefore, only a brief outline of the X2 and X3 multiplier circuits will be given.

AN-417A IC Crystal Controlled Oscillators

Crystal controlled square wave oscillators can be used as clock drivers, harmonic sources for frequency markers, in frequency synthesizers, frequency comparators, etc. It is difficult to obtain high frequency square waves due to the long propagation delays of the most integrated circuits. The MECL 10,000 circuits with 2 ns propagation delays eliminate this problem. This note describes square wave oscillator circuits with crystal control that are capable of output frequencies, inverted and non-inverted, up to 200 MHz.

AN-418 High Speed Monostable Multivibrator Design with MECL Integrated Circuits

This note describes two configurations of monostable multivibrators using the MC1023 clock driver and a delay element. Operating frequencies in excess of 70 MHz and pulse widths of 4 nanoseconds are possible. Methods of obtaining the predetermined delay are also discussed.

AN-419 UHF Amplifier Design Using Data Sheet Design Curves

This note describes the design of UHF narrowband amplifiers using the device loading admittances taken directly from the device data sheet. A design example is given in the form of a 1 GHz microstrip amplifier. Predicted results are compared to actual measured values. Also included is a short discussion on practical microstrip construction techniques.

AN-421 Semiconductor Noise Figure Considerations

A summary of many of the important noise figure considerations related with the design of low noise amplifiers is presented. The basic fundamentals involving noise, noise figure, and noise figure-frequency characteristics are then discussed with the emphasis on characteristics common to all semiconductors. A brief introduction is made to various methods of data sheet presentation of noise figure and a summary is given for the various methods of measurement. A discussion of low noise circuit design, utilizing many of the previously discussed considerations, is included.

AN-422 Testers for Thyristors and Trigger Diodes

This paper describes inexpensive go-no-go testers for thyristors and trigger diodes. Each is very simple to use and is well adapted to incoming inspection and other applications requiring fast testing of major parameters.

AN-423 Field-Effect Transistor RF Amplifier Design Techniques

Amplifier design theory utilizing the two port network model for an active device has been well developed and used extensively in bipolar transistor high frequency amplifier design.

This paper discusses some of the theoretical and practical considerations for using this popular method to design field effect transistor amplifiers.

AN-426A Low-Power Audio Amplifiers Using Complementary Plastic Transistors

The use of complementary-symmetry output transistors in low-power audio amplifiers enables the circuit designer to achieve maximum circuit performance at minimum component cost. This note describes several audio amplifier circuits suitable for power outputs of up to 2 watts with 8-, 16- and 40-ohm loads. Also described is a line-operated single-ended audio amplifier suitable for table-radio or television applications.

AN-432B A Monolithic Integrated FM Stereo Decoder System

This application note discusses the circuit approach that has been taken in the realization of the first monolithic integrated stereo multiplex decoder built for consumer usage, as well as some of the details concerning its incorporation in an FM stereo receiver.

AN-436 Conventional and Soft-Start Dimming of Incandescent Lights

This note describes two dimmers that provide wide-range control of incandescent light intensity by adjusting the angle of conduction in a series triac. One dimmer features simplicity for small size and low cost, while the other offers soft-start operation to limit inrush current and lengthen lamp life.

AN-437A Design Considerations and Performance of Motorola Temperature-Compensated Zener Reference Diodes

This application note defines Motorola temperature-compensated zener (reference) diodes, explains the device characteristics, describes electrical testing, discusses the advanced concepts of device reliability and quality assurance, and outlines device construction.

AN-439 MC1539 Op Amp and its Applications

This application note discusses the MC1539, a second generation operational amplifier. The general use and operation of the amplifier is discussed with special mention made of improved operation over that of its first generation predecessor—the 709 type amplifier.

In addition to the detailed discussion on the DC and AC operation of the device, considerable emphasis is placed on operational performance. Many applications are offered to demonstrate the device capability, including a high frequency feed-forward scheme, and a source follower application.

AN-440 Theory and Characteristics of Phototransistors

A brief history of the photo-electric effect is discussed, followed by a compreshensive analysis of the effect in bulk semiconductors, pn junctions and phototransistors. A model is presented for the phototransistor. Static and transient data for the MRD300 provide typical phototransistor characteristics. Appendices provide a discussion of the relationship of irradiation and illumination and define terms specifically related to phototransistors.

AN-441 SCR Slaving Circuits

This circuit makes use of a low-cost transistor to overcome the limitations of a conventional R-C discharge circuit in slave firing of an SCR. It is especially useful where zero-point switching techniques are employed to control large electrical loads.

AN-442 Designing DC-DC Converters for Capacitor Charging with Batteries

This paper outlines design considerations for converters used for charging energy-stored capacitors with low-voltage batteries. The ratio of capacitor voltage to battery voltage is chosen to be greater than 100.

A discussion of converter characteristics is presented here from the standpoint of efficiency, frequency of oscillation, rate of energy transfer from battery to capacitor, and peak battery current drain.

A complete circuit is included that is tolerant of semiconductor parameter variations and is thus suitable for economical mass production.

AN-443 Directional and Speed Control for Series, Universal and Shunt Motors

A simple circuit containing few components allows control of both speed and direction of rotation of DC motors. The use of thyristors provides continuous driver control through the speed range without compromising the torque characteristics of the motors.

AN-445 Pulse-Width Modulation for DC-Motor Speed Control

Feedback derived from a motor's armature and dependent on its speed can be used to counteract the reduction in speed that accompanies loading. This note describes two speed-control circuits which use different methods to obtain the feedback signal. One method uses voltage sensing, and the other an optical pickup.

AN-447 Fast Charging Systems for Ni-Cd Batteries

This note discusses the requirements and problems encountered in designing fast charging systems for nickel-cadmium (Ni-Cd) cells, including some cell characteristics affected by high-rate charging.

AN-450 Induction Motor Speed Control

A method of providing speed control above and below design speed for an induction motor is shown in this note. Such speed control increases the versatility of an induction motor and permits it to be used in fulfilling requirements formerly satisfied only by DC motors.

AN-451 A Frequency Counter Using Motorola RTL Integrated Circuits

A frequency-period counter with a total hardware cost under $200.00, based on unit quantity prices, is described. The instrument measures the periods and frequencies of periodic waveforms, ranging in frequency from 10 Hz to 20 MHz, and counts random occurances for selected gate times of one millisecond to 10 seconds. A four digit decimal readout is provided. The low cost is achieved by utilizing plastic MRTL devices in unique versions of a crystal controlled oscillator, a period selector, a one shot multivibrator, a pulse shaper, and a switch contact bounce eliminator circuit.

AN-453 Zero Point Switching Techniques

This note discusses two unique pulse-type thyristor triggering circuits which meet the exact timing requirements of zero-point switching. They dissipate very little power and can be used with either sensitive or "shorted" gate devices.

AN-454 AC Overcurrent Protective Circuit with Automatic Reset

A unique circuit that will protect AC resistive loads from both overvoltage and overcurrent is shown. One feature of this circuit is that the sensing element is not in series with the load when the load is turned on.

AN-455 Using the FET Designers Data Sheet for Worst Case Amplifier Circuit Design

Basic information for the use of field-effect transistors is provided, and is an aid to complete understanding of the Designers Data Sheet. This report discusses the advantages, disadvantages, types and modes of operation of FETs and presents a definitive discussion of key parameters with their relationship to circuit design, when applicable.

AN-456 A 50 MHz Programmable Counter Designed with MECL II Integrated Circuits

A high speed programmable counter using the MECL II family of logic is discussed. The counter is designed to accept an input frequency up to 50 MHz and divide it by any number from 2 to 999. This number is programmed into three decades of synchronous down counters. These decades with additional decoding and control logic comprise a complete high speed divide-by-N counter system.

AN-459 A Simple Technique for Extending Op Amp Power Bandwidth

The design of fast response amplifiers is presented without the use of "tricky" compensation procedures.

AN-460 Using Transient Response to Determine Operational Amplifier Stability

Analysis and an example are given for a technique that evaluates the stability of any particular feedback amplifier configuration by analyzing its response to a step-function input.

AN-461 Transient Suppression with a Power Zener Diode

This note discusses sources of voltage transients and their detection, and describes transient suppression using power zener diodes designed for this purpose.

AN-462 FET Current Regulators–Circuits and Diodes

Included are numerous FET current sourcing circuits, along with an extensive treatment of the current regulating diode and its uses as a valuable component in circuit design.

AN-464 MTTL Designer's Note–The MC4004/MC4005, A 16-Bit Random Access Memory

Pertinent information for the design of high speed, non-destructive readout (NDRO) memory systems using the MTTL 16-bit memory chip is given. The topics discussed are: (1) operation of the 16-bit memory including typical read and write sequences, (2) typical DC and switching characteristics as a function of temperature, power supply, and output load, and (3) examples of memory system organization utilizing the 16-bit memory as the basic cell.

AN-465 MTTL Designer's Note–The MC4006/MC4007 Decoders

Operation and expansion capabilities and examples of the system use of the MC4006 Binary to One-of-Eight Decoder and the MC4007 Dual Binary to One-of-Four Decoder are discussed.

AN-466 Circuit Applications for the Triac

This note discusses the basic theory of operation of the triac with control methods and circuit applications. Among the applications included are basic switches, lamp dimmers, motor controls, a heater control, a flasher, a regulator, protective circuits and zero-point switching.

AN-467 Using Motorola High Threshold Logic

This application note explains operation of the Motorola High Threshold Logic (MHTL) family of integrated circuits. It briefly describes the members of the family and provides many of the characteristics of the units. Several examples are provided to aid the reader in the application of this unique logic family.

AN-469 Line Operated 15-kHz Inverter

The circuit shown in this note is a line-operated inverter. It makes use of high-voltage, high-frequency silicon power transistors to provide 120 Volts and 200 Watts at 15 Kilohertz. Because of the high frequency of operation, the components used can be small in size, resulting in a very compact inverter.

AN-470 Bipolar Chopper Transistors and Circuits

Bipolar transistor chopper circuits are used in many applications for low-drift amplification of DC and low-frequency AC signals. This note discusses the characteristics of transistors used as choppers and the circuits in which they can be used.

AN-471 Analog-to-Digital Conversion Techniques

The subject of analog-to-digital conversion and many of the techniques that can be used to accomplish it are discussed. The paper is written in general terms from a system point of view and is intended to assist the reader in determining which conversion technique is best suited for a given application.

AN-472 Mounting and Heat Sinking Uniwatt Plastic Transistors

The Uniwatt plastic package is now being used for several medium-power transistor types. This note describes several methods for mounting such devices, with emphasis on proper heat sinking for best thermal characteristics.

AN-473 A Monolithic High-Power Series Voltage Regulator

This note discusses MC1560/MC1561 voltage regulator in terms of internal operation, development of these circuits, and how they are advantageously used in supply fabrication.

AN-474 The MC1541–A Gated Dual-Channel Sense Amplifier for Core Memories

The MC1541 sense amplifier can provide many magnetic core memory systems with lower system cycle times and a lower package count than with previous sense amplifiers. Circuit operation, design considerations, interface problems and typical applications are discussed.

AN-475 Using the MC1545–A Monolithic, Gated-Video Amplifier

Because of the unique design of the MC1545, this amplifier can be used as a gated video amplifier, sense amplifier, amplitude modulator, frequency shift keyer, balanced modulator, pulse amplifier, and many other applications. This note describes the AC and DC operation of the circuit and presents applications of the device as a video switch, amplitude modulator, balanced modulator, pulse amplifier, and others.

AN-476 MTTL Designer's Note–The MC4000 Data Selector and the MC4002 Data Distributor

Two MTTL complex functions, the MC4002 four and two-channel data distributor, and the MC4000 dual four-channel data selector are discussed. Their basic modes of operation and expansion capabilities are described. Examples of the use of the data distributor and the data selector in various systems are presented.

AN-477 A 30-Watt 175 MHz Power Amplifier Using PNP Transistors

This note describes a three-stage power amplifier that delivers 30 Watts output at 175 MHz. It utilizes the first commercially available VHF PNP high-power transistors to provide 29 dB gain, 50% overall efficiency, and low spurious output.

AN-478A Small-Signal RF Design with Dual-Gate MOSFETS

The dual-gate MOSFET offers low noise, high gain, and excellent AGC, cross-modulation and overload characteristics in RF applications. Recent devices also feature silicon nitride passivation for ease of handling and reliability. This note discusses the characteristics of dual-gate MOSFETs, with emphasis on designing circuits, noise figure, AGC, bandwidth and detuning, cross-modulation and mixer operation.

AN-480 Regulators Using Operational Amplifiers

The theory of op amp voltage regulator design is discussed. The problem areas associated with such designs are also detailed. The MC1560 is used as a OTC voltage reference in the op amp regulator designs that are shown. It is shown that regulation from 0.01% to 0.001% is possible.

AN-481 A Broadband 4-Watt Aircraft Transmitter

This report describes a 4-Watt wideband AM aircraft transmitter intended for light aircraft. The frequency range is 118 to 136 MHz and no tuning is required when changing frequency. The RF circuitry can be operated from 12.5 Volts, or can be used with a series modulator described in the note from 26 Volts.

AN-482 Electronic Speed Control of Appliance Motors

This application note discusses the possibilities of controlling several types of induction motors, universal motors, and permanent-magnet motors, and includes circuit designs for each. By matching the motor to its electronic control, the designer can obtain a simple and efficient system.

AN-483B 20 and 30 Watt Power Amplifiers Using Darlington Output Transistors

Use of monolithic power Darlington output transistors can greatly simplify the design of high-fidelity amplifiers. Described herein is a 20-Watt amplifier which uses only three transistors, and a 30-Watt amplifier which uses four.

AN-484A Medium-Power Audio Amplifiers

This note describes a basic circuit design approach for audio complementary power amplifiers. Procedures are detailed for the selection of input, driver and output transistors. Both simple and Darlington transistor systems are included. Biasing, thermal considerations, overload protection and power supply information is given extensive treatment.

Design examples, including all circuit values, performance data and suggested P.C. board layouts, are given for simple transistor amplifiers at the 3, 5, 7, 10, 15, 20, 25, and 35 Watt levels. Also included are three amplifiers using Darlington output transistors at the 15, 20, and 25 Watt levels.

AN-485 High-Power Audio Amplifiers with Short-Circuit Protection

This application note describes a recommended circuit approach for high-performance audio amplifiers in the 35-Watt to 100-Watt RMS power range. Circuitry is included which enables the amplifier to operate safely continuously under any load condition including a short.

AN-487 A High-Speed Ripple-Through Arithmetic Processor

A simple, systematic building block approach for designing a high-speed, ripple-through arithmetic processor is described. Using only gates and full adders, ultra-high speed multiplication, division, square root extraction, addition, and subtraction may be performed. Several variations of an arithmetic processor design are detailed and comparisons of speed and package count using the MECL and MDTL logic in 14-pin, 16-pin, 24-pin, 32-pin, and 64-pin packages are given.

AN-488 High-Speed Addition Using Lookahead Carry Techniques

The use of the lookahead carry principle to increase the operating speed of adder systems is described. Several adders of different sizes using variations of lookahead carry are developed and the logical implementation of these using the MTTL III and MECL II and III logic families is given.

AN-489 Analysis and Basic Operation of the MC1595

The MC1595 monolithic linear four-quadrant multiplier is discussed. The equations for the analysis are given along with performance that is characteristic of the device. A few basic applications are given to assist the designer in system design.

AN-491 Gated Video Amplifier Applications The MC1545

This application note reviews the basic operation of the MC1545 and discusses some of the more popular applications for the MC1545. Included are several modulator types, temperature compensation of the active gate, AGC, gated oscillators, FSK systems, and single supply operation.

AN-492 Operating Characteristics of Motorola MC3000/MC3100 Series Transistor-Transistor Logic Gates

This application note explains the advantages of using the MC3000/MC3100 Series of conventional TTL. Design data is included which should allow determination of the operating characteristics under almost any set of conditions.

AN-493 The MC3000/MC3100 Series Transistor-Transistor Logic Flip-Flops

This application note explains the basic operation of the various flip-flops available in the MC3000/MC3100 series of transistor-transistor logic from Motorola. Typical operating characteristics are included so that operation under different conditions can be determined.

AN-495 A 25-Watt, 175 MHz Transmitter for 12.5-Volt Operation

This note describes the power amplifier stages of a 175-MHz 25-watt transmitter. The transmitter requires a 12.5 Volt DC power source and is therefore suitable for operation directly from the electrical system of a 12-Volt vehicle.

AN-496A Error Detection and Correction Using Exclusive-OR Gates and Parity Trees

The availability of Exclusive OR gates and parity trees allows digital system designers to use error detection and correction codes to improve their system reliability and maintainability without the major cost penalty that has existed in the past. Use of Exclusive-OR gates and parity trees available in the MRTL, MTTL, MDTL, and MECL families to design simple parity and single error Hamming parity detection and correction circuits is discussed.

AN-498 Voltage and Current Boost Techniques Using The MC1560-61

The stability requirements for the current boosted MC1560-61 are discussed. Both internal and external compensation techniques are shown, along with heat-sink design information and typical circuits, including a self-oscillating switching regulator, and a voltage boost circuit.

AN-499 Shutdown Techniques for the MC1560-61/69 Monolithic Voltage Regulators

This note discusses the many ways one can use the shutdown control for the MC1560 Monolithic Voltage Regulator. These include logic control, short circuit detection, over voltage detection, junction temperature control, and thermal feedback. Also discussed, are current foldback and methods of restarting automatically from the shutdown state. The techniques discussed apply equally to the MC1560, MC1561, and MC1569 positive voltage regulators.

AN-500 Development, Analysis, and Basic Operation of the MC1560-61 Monolithic Voltage Regulators

In this note, the anlysis and basic operation of the MC1560 and the MC1561 voltage regulators are discussed. The tests and parameters used on the data sheet are considered, and the problems of specifying a monolithic voltage regulator are identified. The basic circuit configurations are shown with some insight for the typical performance one can expect.

AN-502A A 40-Watt, 50-MHz, Transmitter for 12.5-Volt Operation

This report describes a three stage, three transistor transmitter capable of providing 40 Watts continuous power output at 50 MHz in operation from a 12.5 Volt supply.

The synthesis of the matching networks in the transmitter is greatly simplified by the application of a design procedure utilizing large-signal transistor impedance data.

AN-503 A 25-Watt Broadband Aircraft Transmitter

This report describes a wideband aircraft transmitter with a typical carrier output of 25 Watts. The frequency range is 118-136 MHz and no tuning is required. The supply voltage is 13.6 Volts.

AN-504 The MC1600 Series MECL III Gates

This application note explains the basic operation of the various gates available in the MECL III logic family. Typical operating characteristics are included as an aid to the designer of high-speed logic along with recommended layout, breadboarding, and testing procedures. This note will also provide the designer with some insight into the overall capabilities of this logic line as they apply to this application.

AN-505 The MC4012, A MTTL 4-Bit Shift Register

The MC4012 is a 4-bit shift register consisting of four D-type flip-flops operated in the synchronous mode and may be used for temporary storage of information. The MC4012 may be operated in either the parallel or serial mode input depending upon the logic state of the mode control. Circuit operation and various applications of the device are the subject of this application note.

AN-506 Code Conversion with Semiconductor Read Only Memories

In digital systems, data is manipulated and transmitted in coded form and frequently must be translated from one code into another. The use of ready only memories to perform the various code conversions is discussed in this note. In particular, methods for converting data from the binary code to the binary coded decimal representation, and vice versa, are detailed. Conversion from the Hollerith code to the common 8-bit codes, such as the RS-358, ASC II, and EBCDIC codes, as well as conversions between the 8-bit codes are also treated.

AN-507 A 13-Watt Broadband AM Aircraft Transmitter

This report describes a wideband AM aircraft transmitter with a typical carrier output level of 13 Watts. The frequency range is 118 to 136 MHz with no tuning required. The supply voltage for the transmitter is 13.6 Volts. A transformerless series modulator is also described, and with this system, a 27.2-Volt supply is required. Lower-power 2.5 and 7-Watt transmitters are also included.

AN-508 Applications of Phototransistors in Electro-Optic Systems

This note reviews phototransistor theory, characteristics and terminology, then discusses the design of electro-optic systems using device information and geometric considerations. It also includes several circuit designs that are suited to DC, low-frequency and high-frequency applications.

AN-509 True RMS Voltage Regulators

This note describes AC voltage regulators that are ideal for use with electronic and electrical equipment such as lamps and heaters that are highly sensitive to supply voltage. These regulators maintain constant RMS voltage levels for input or load changes.

AN-510A A Low-Cost, Solid-State Function Generator

This report describes an inexpensive function generator with sine-, square-, and triangular-wave outputs. A combination of discrete and integrated circuits provide lowest cost without sacrificing good performance. Maximum output amplitude of all waveforms is 20 Volts peak to peak from a 50-Ohm output impedance. Frequency range is 1 Hz to 1 MHz.

AN-511 Low Frequency Applications of Field-Effect Transistors

Field-effect transistors enjoy usage in a wide range of applications at both high and low frequencies. This report discusses the low-frequency applications, with an emphasis on the lesser-known uses. General topics covered are switches and choppers, amplifiers, voltage-variable resistors, current limiters, and microwatt logic.

AN-512 Applications of Fast-Recovery Recitifiers

Many applications that use silicon rectifiers at high frequencies or repetition rates can be improved with fast-recovery diodes. This note discusses the characteristics of these diodes and describes typical applications in which they excel.

AN-513 A High Gain Integrated Circuit RF-IF Amplifier with Wide Range AGC

This note describes the operation and application of the MC1590G, a monolithic RF-IF amplifier. Included are several applications for IF amplifiers, a mixer, video amplifiers, single and two-stage RF amplifiers.

AN-517 Improving the Efficiency of Low-Voltage, High-Current Rectification

The efficiency of low-voltage, high-current rectification can be improved by using either barrier rectifier diodes or synchronous rectification. This note discusses both approaches and compares them to the use of conventional silicon rectifiers.

AN-518 Constant-Speed Motor Control Using Tachometer Feedback

A simple tachometer can provide feedback control for shaded-pole motors and better brush life for universal motors. This note describes pickups and circuits suitable for use in such equipment as home appliances and power tools.

AN-519 Using MDTL Logic Blocks

This application note discusses typical applications of basic MDTL components such as gates and flip-flops, with emphasis placed on the positive logic AND, OR, NOR, NAND, and Exclusive-OR functions. Methods of interfacing MDTL with other popular logic families are also discussed.

AN-521 Using Balanced Emitter Transistors in RF Applications

Motorola Balanced Emitter Transistors provide excellent performance and resistance to burnout under conditions of mismatching and detuning in high-frequency power amplifiers. This note describes the characteristics and typical applications of these transistors.

AN-522 The MC1556 Operational Amplifier and its Applications

This application note discusses the MC1556, a second generation, internally compensated monolithic operational amplifier. Particular emphasis is placed on its distinct advantages over the early 709-type amplifier and the more recent 741-type amplifier.

Along with a description of its operation this note presents a discussion on various applications of the MC1556, highlighting its capabilities, and points out its characteristics so the reader may make effective use of the device.

AN-523 MOS Multiplex Switches

The characteristics and parameters of the MC1150 and the MC1151 MOS Multiplex Switches are described and the use of these devices in multiplexers and decoder drivers is discussed. Also included is a discussion of logic level translators for interfacing these MOS devices with other logic lines such as RTL, DTL, and TTL.

AN-524 Converting Relay Control Systems to Digital ICs

Basic Boolean Algebra and logic functions are defined and discussed. A method of converting relay diagrams to logic diagrams is then presented. Several examples and a system design illustrate the conversion method using MHTL.

AN-526 Theory, Characteristics and Applications of Silicon Unilateral and Bilateral Switches

The SUS/SBS are constructed as simple integrated circuits which perform as gated or voltage sensitive switches. Device theory and operation are explained plus circuit applications in the areas of power thyristor triggering and logic. Devices illustrated include the MUS4987-88 and the MBS4991-92.

AN-527 Theory, Characteristics and Applications of the Programmable Unijunction Transistor

This note discusses the characteristics of a programmable unijunction transistor (PUT) and offers comparisons with the Annular unijunction. Also included are several circuits showing the versatility of the PUT.

AN-528 Binary-to-BCD and BCD-to-Binary Conversion With Complex IC Functions

Complex function integrated circuits reduce the cost of performing conversion from binary to the BCD code or from the BCD code to binary. Four methods of performing each conversion are discussed and compared.

AN-529 Regulated Line Operated Inverter Uses High Voltage Power Transistors and Hot Carrier Rectifiers

This report describes a line operated 225 Watt preregulated power supply which offers considerable reductions in overall size and weight as compared to more conventional techniques of obtaining low voltages at high currents.

AN-530A The MC7491A Eight-Bit Serial Shift Register and the MC7495 Four-Bit Shift Register

Operation of the MC5491A/7491A 8-bit shift register and the MC5495/7495 4-bit universal shift register is discussed. Typical applications are covered for each device and use of the two devices in a data transmission system is illustrated.

AN-531 MC1596 Balanced Modulator

The MC1596 monolithic circuit is a highly versatile communications building block. In this note, both theoretical and practical information are given to aid the designer in the use of this part. Applications include modulators for AM, SSB, and suppressed carrier AM; demodulators for the previously mentioned modulation forms; frequency doublers and HF/VHF double balanced mixers.

AN-532A MTTL and MECL Avionics Digital Frequency Synthesizer

This application note discusses several approaches that illustrate applications of complex digital integrated circuits directed toward avionics frequency synthesizers. The techniques presented point out the simplicity with which both MTTL and MECL digital integrated circuits can be used to produce frequency synthesis for avionic communications.

AN-533 Semiconductors for Plated-Wire Memories

An introduction to the operation and electrical characteristics of plated-wire memories is provided in conjunction with the applications of semiconductors that interface with the plated-wire memories.

Devices discussed include drivers, sense amplifiers, and decoders. Memory organization and memory-related semiconductor applications are also mentioned.

AN-534 Commutating Filter Techniques

This note describes the design and construction of commutating (digital) filters using Motorola MECL II, MTTL III and MC7400 digital integrated circuits. A short section on commutating filter theory is included along with examples of filters and their responses.

AN-536 Micro-T Packaged Transistors for High Speed Logic Systems

Integrated circuits have become the first thought of most designers faced with a digital problem. For specialized needs such as extremely high speed, high speed with minimum power dissipation, or unusual logic functions, however, discrete transistors in the ultra-small Micro-T package may prove advantageous.

AN-537 The MC4023, An MTTL 4-Bit Universal Counter

The MC4023 Universal Counter can be connected to count any number from two through twelve except seven and eleven. For all settings, counting is in a binary sequence from count zero to the selected number. Operating characteristics and applications of the device are the subject of this application note.

AN-538A Motorola Complementary MOS Integrated Circuits

This note discusses some of the properties of N-channel and P-channel MOSFETs and describes how they are used to construct complementary MOS integrated circuits. Some basic McMOS logic functions are then discussed and methods of cascading McMOS counters are given.

AN-540 A Synchronously Gated N-Decade Sweep Oscillator

This report describes a unique solid-state sweep oscillator system which hypothetically can be swept over any frequency range. The prototype discussed herein is swept over only five decades. Options are provided to preselect any one, two or five frequency decades between 10 Hz and 10 MHz, whether sequential or not.

AN-541 Medium Scale Integration in the Numerical Control Field

Since medium scale integration means complex functions, the logic design engineer must understand both the product and its end use in order that his design be optimized. Transistor-Transistor Logic has a number of devices such as programmable counters, phase detectors, voltage controlled multivibrators, comparators, etc., which are available today in integrated circuit form. The devices can be applied to the numerical controls field and are the subject of this paper.

AN-543 Integrated Circuit IF Amplifiers for AM/FM and FM Radios

This application note discusses the design and performance of four IF amplifiers using integrated circuits. The IF amplifiers discussed include a high performance circuit, a circuit utilizing a quadrature detector, a composite AM/FM circuit, and an economy model for use with an external discriminator.

AN-544A Printed Circuit VHF TV Tuners Using Tuning Diodes

Two printed circuit VHF varactor tuners were designed and built in the Motorola Applications Laboratory. Both designs were centered around tuning diodes, PIN band switching diodes, the dual-gate MOSFET, and a cascode mixer. One tuner uses a high capacitance tuning diode while the other uses a low capacitance device. This note describes the tuners, the design procedures, and the tuner performance.

AN-545 Television Video IF Amplifier Using Integrated Circuits

This applications note considers the requirements of the video IF amplifier section of a television receiver, and gives working circuit schematics using integrated circuits which have been specifically designed for consumer oriented products. The integrated circuits used are the MC1350, MC1352, MC1353 and the MC1330.

AN-546 Solid-State Linear Power Amplifier Design

Linear amplifier design techniques and new RF power transistors developed specifically for HF (2-30 MHz) linear amplifier service are discussed.

AN-547 A High-Speed Dual Differential Comparator, The MC1514

This application note discusses a few of the many uses for the MC1514 dual comparator. Many applications such as sense amplifiers, multivibrators, and peak level detectors are presented.

AN-548A Microstrip Design Techniques for UHF Amplifiers

The design and construction of a 25-Watt UHF power amplifier utilizing microstrip techniques for the 450 to 512 MHz band is discussed. The amplifier utilizes the 2N5945, 2N5946 and 2N6136 RF power transistors.

AN-549 A Vertical Deflection Circuit Using Complementary Transistors

A vertical deflection system for television sets is discussed which uses complementary transistors in the output stage to avoid the need for an output transformer. This system consists of two separate circuits—an oscillator and a power amplifier—either of which can be used separately or as part of a different system. The oscillator produces a sawtooth voltage waveform. The power amplifier converts a sawtooth voltage waveform into a sawtooth current waveform to drive the scan coils.

AN-550 Programming the MCM5003/5004 Programmable Read Only Memory

This note describes programming methods for the MCM5003/5004 512-bit (64x8) TTL Programmable Read Only Memory (PROM). These program methods can result in short design cycles for custom ROM circuits. Operation and circuit details of the MCM5003/5004 are given first. Then programming methods and circuitry are discussed. The simplest programmer uses only five ICs, while a more sophisticated programmer, using automatic sequencing, requires a total of 25 ICs.

AN-551 Tuning Diode Design Techniques

Epicap tuning diodes offer many advantages over air variable capacitors. However is some applications their capacitance drift with temperature changes must be overcome with suitable compensation techniques. This note discusses a number of considerations to be employed in designs using tuning diodes.

AN-552 The Control Engineer's Guide to IC Applications

This report is a guide to the use of integrated circuits, and as such provides practical solutions to a number of common problems encountered in circuits used for sensing and control which must operate in an industrial environment. The report is divided into two parts–digital ICs and linear ICs.

AN-553 A New Generation of Integrated Avionic Synthesizers

The need to generate signals of a multitude of different frequencies for avionic systems has resulted in complex solutions in the past. With the introduction of certain standard product integrated circuits, frequency synthesis using digital phase locked loop techniques presents a more practical solution. Several different types of servo phase locked loop systems are discussed and a practical design example is given. Results of design examples are presented along with possible applications.

AN-555 Mounting Stripline-Opposed-Emitter (SOE) Transistors

The basic construction of the Stripline-Opposed-Emitter package used for many RF power transistors is described. Methods of mounting and heat-sinking both stud and flange type packages which allow best utilization of the transistor's dynamic and thermal properties are discussed. These mounting methods prevent the possibility of device damage due to improper mounting techniques.

AN-556 Interconnection Techniques for Motorola's MECL 10,000 Series Emitter Coupled Logic

This application note describes some of the characteristics of high speed digital signal lines and gives wiring rules for MECL 10,000 emitter coupled logic. The note includes discussions of printed circuit board interconnects, board-to-board interconnects, and wirewrapping techniques.

AN-557 Analog-to-Digital Cyclic Converter

The A/D cyclic converter discussed in this note provides medium speed (1-5μs/ bit) and medium accuracy (7 or 8 bits) operation. A Cyclic converter uses the successive approximation technique in which an unknown analog input voltage is successively compared to a reference voltage to determine each bit of the digital output.

The cyclic converter offers continuous operation, automatic generation of the digital output in Gray-code form, and a building block structure. This structure uses a separate but identical circuit for each resolution bit. The cyclic converter finds use primarily in control and process applications.

AN-558 CRT Display with Dynamic MOS RAM Storage

Dynamic MOS RAMs are well suited to provide local storage in CRT display systems. Of necessity, the information placed on a standard CRT display must continually be scanned, or refreshed. As the CRT system performs its repetitive scan, an associated dynamic RAM can be automatically refreshed. An alphanumeric readout CRT display system, with its necessary support circuitry, are described in this note.

AN-559 Simple RAMP A/D Converter

A simple single ramp A/D converter which incorporates a calibration cycle to insure an accuracy of 12 bits is discussed. The circuit uses standard ICs and requires only one precision part–the reference voltage used in the calibration. This converter is useful in a number of instrumentation and measurement applications.

AN-560 Designing Tuned Lines for UHF TV Tuners

Transmission line equations have been used to obtain graphs which show the relationships between line length, tuning capacitance ratio, characteristic resistance and capacitance magnitude in the 473 MHz to 887 MHz range. Graphs are also included for oscillator tuned line design–517 MHz to 931 MHz.

AN-561 How to Use Photosensors and Light Sources

Practical methods are given for the design of light-sensing circuits using both semiconductors and incandescent light sources. A discussion on measuring light sources is also included.

AN-562 **MOS Dynamic RAMS in Memory Systems**

This note discusses the design of several minicomputer mainframe systems which use the 1024-bit MCM1172L and MCM1173L, the first in Motorola's expanding line of MOS dynamic memories. The first system discussed is a 4k word by 16-bit memory that uses the MCM1173L. The second system has a power down battery backup modification which allows "conditional" non-volatility, or non-volatility for the life of the battery. The third memory system is much larger with a total storage of one megabyte. The main feature of this system is a combination of random and sequential access.

AN-563 **Hybrid Gain Modules for Use in CATV Trunk and Line Extender Amplifiers**

This report describes three hybrid gain modules intended for CATV trunk line and line extender amplifiers. These modules are designed to operate from a +24 Vdc power supply and cover the 40–300 MHz frequency range.

AN-564 **An ADF Frequency Synthesizer Utilizing Phase Locked-Loop Integrated Circuits**

This application note describes an IC phase locked-loop frequency synthesizer suitable for the local osciallator function in aircraft Automatic Direction Finder (ADF) equipment.

AN-565 **Using Shift Registers as Pulse Delay Networks**

This note discusses a high-speed clocked shift register using MECL 10,000 flip-flops and employed as a digital incremental delay. The register may be clocked with a frequency division counter to accomplish delay with increments as small as 7.5 ns. The circuit, as developed, may be used for timing basic computer decisions or as an adjustable digital delay line for pulses.

AN-566 **High Speed Binary Multiplication Using the MC10181**

With a MECL 4-bit arithmetic unit you can reduce both package count and interconnections in a ripple multiplier and achieve very fast multiply times.

AN-567 **MECL Positive and Negative Logic**

Eight positive or negative logic assignments may prove convenient to the MECL system designer. This note describes the equivalences between the two approaches and provides guides for converting between them.

AN-568 **A Fuse-Thyristor Coordination Primer**

This report treats the considerations required for the use of fuses in protecting thyristors against short circuit fault currents. Basics of the mating philosophy are discussed and practical examples of coordination are given. Symbols, terms and their definitions are included.

AN-569 **Transient Thermal Resistance—General Data and Its Use**

Data illustrating the thermal response of a number of semiconductor die and package combinations are given. Its use, employing the concepts of transient thermal resistance and superposition, permit the circuit designer to predict semiconductor junction temperature at any point in time during application of a complex power pulse train.

AN-571 **Isolation Techniques Using Optical Couplers**

The material presented gives the basic considerations needed for using optical couplers. Although limited in example to the MOC1000 coupler, the information applies to other optical couplers where gallium arsenide diodes and silicon detectors are used.

AN-572 **Initial Reliability Report for MECL 10,000 Integrated Logic Circuits**

This report presents the first reults of a continuing MECL 10,000 reliability program. It is based on a relatively small number of accumulated device hours. However, the limited data point strongly toward a high level of reliability for the MECL 10,000 Series high speed logic family.

AN-573 **Engineering Report: A Comparison Between MECL 10,000 and Schottky TTL Minicomputer Designs**

Two identical high speed minicomputer designs were performed, one using MECL 10,000 devices, the other using Schottky TTL devices. An evaluation was then made of the relative advantages of each logic family in the design. System speed of the MECL 10,000 machine was improved by 100%, while cost was up by only 50% over the TTL-S design.

AN-574 **CMOS: A New Logic Type For Control Systems**

Designing circuits that operate properly in high noise environments such as those commonly found in an industrial plant is often the bane of the control systems designer. CMOS circuits offer high noise immunity, plus the additional benefits of operation over a broad range of power supply levels and very low power dissipation. This article compares CMOS to other logic types and then describes how to interface it to them.

AN-575 Variable Speed Control System for Induction Motors

This report describes a method of controlling the speed of standard induction motors above and below their rated speeds. A unique variable frequency drive system is used to maintain the rated output torque at speeds below the nameplate rating.

AN-576 The Logical Design of Shift Counters

Two techniques are presented that aid in the design of shift-register counters. Results for "sequence tree" and "count multiplication" techniques for cycle lengths of 30 or less are given. Solutions for both "D" flip-flop and J-K flip-flop as input elements of the shift register are shown.

AN-577 Design Techniques for an 80 Watt, 175 MHz Transmitter for 12.5 Volt Operation

This report describes the design of a four stage power amplifier capable of providing 80 Watts continuous power output at 175 MHz when operating from a 12.5 Volt supply. Techniques for operating two devices in parallel for the output stage are presented. Performance data, high load VSWR information, and thermal design considerations are also included.

AN-578 UHF Microstrip Amplifiers Utilizing G-10 Epoxy-Glass Laminate

This note discusses the use of G-10 epoxy-glass laminate as a microstrip substrate. Two UHF power amplifiers are designed and used to evaluate the overall performance of the laminate.

AN-579 Testing MECL 10,000 Integrated Logic Circuits

Circuit testing techniques become increasingly important as circuit speeds appraoch and exceed the 2 ns range. With MECL 10,000 and MECL III circuits it is possible to exploit their 50-Ohm output drive capability to obtain highly accurate test data. This application note describes techniques for testing MECL 10,000 circuits for laboratory evaluation, and discusses key parameters which should be measured during incoming inspection rapid testing.

AN-580 Thermal Runaway in High Power Thyristors

The temperature dependence of reverse biased junction current may cause thermal runaway if an adequate heat dissipator is not used. Dissipator thermal resistance can be found from the presented curves. The mathematical derivation of the design equations based upon semiconductor theory is given and its examples illustrate use of the curves.

AN-581 An MSI 500-MHz Frequency Counter Using MECL and MTTL

The design of a MSI 8-digit LED readout 500 MHz counter using MECL III, MECL 10,000 and TTL is discussed. Described are two prescalers using MECL, along with the designs for two input amplifiers. A unique time-base controller is also shown for providing a multiphase clock to the counter.

AN-582 An Introduction to Using the MCBH7601 Crosspoint Switch

This application note describes the operation and properties of Motorola's MCBH7601 Crosspoint Switch. In addition, methods for addressing individual crosspoints within the 16 switch (4x4) array are discussed. Finally, the formation of larger arrays by interconnections among multiple MCBH7601s, is described.

AN-583 A MECL 10,000 Main Frame Memory System Employing Dynamic MOS RAMS

This application note describes the construction of a dynamic MOS random access memory system that employs MECL 10,000 for the memory control logic. Considered in detail are the memory organization, layout rules, interfacing, and generation of the needed control signals.

AN-584 Programmable Counters Using the MC10136 and MC10137 MECL 10,000 Universal Counters

This application note describes operation of two MECL 10,000 universal counters and their use in high speed programmable counters. Circuit diagrams and waveform traces are included.

AN-585 VHF Power Amplifiers Using Paralleled Output Transistors

This report provides schematic diagrams, test results and construction information for two 80 Watt amplifiers designed for 12.5 Volt operation. These amplifiers are suitable for use as power amplifier stages in new VHF, FM transmitter designs and as ADD-ON outboard amplifiers to boost the power of existing transmitters. Detailed design procedures for similar amplifiers are given in AN-577.

AN-586 Measure Frequency and Propagation Delay with High Speed MECL Circuits

This application note describes an ECL frequency counter useful to 160 MHz, along with a propagation delay measuring circuit capable of 100 picosecond resolution.

AN-587 Analysis and Design of the Op Amp Current Source

A voltage controlled current source utilizing an operational amplifier is discussed. Expressions for the transfer function and output impedances are developed using both the ideal and non-ideal op amp models. A section on analysis of the effects of op amp parameters and temperature variations on circuit performance is presented.

AN-588 A 20 kHz, 1kW Line Operated Inverter

This report describes a 1 kilowatt ultrasonic inverter for use in 208-volt, line-operated, computer main-frame power supply systems. This particular design has an output capability of 5 Volts at 200 Amperes.

AN-589 Generate Custom Waveforms Digitally

A method of generating custom waveforms using IC counters, a read-only memory, and a new monolithic D/A Converter is described. Performance of a prototype model is noted as well as possible applications.

AN-590 Servo Motor Drive Amplifiers

The design of transformerless, AC servo amplifiers using power darlington transistors and IC op amps are discussed. Two types of power amplifiers are illustrated, one using single +28 Volt power supply, the second using high voltage transistors in complementary configuration for operating directly off the line.

Four different op amp preamplifiers and 90 phase shifters are also described.

AN-591 Using McMOS in System Designs – Those All-Important Details

While much of the available literature has focused on introducing the CMOS technology and describing its potential, this discussion proceeds one step further and explores how to use CMOS devices most efficiently. There are important interrelationships behind the device features and performance specs, the parameter sensitivities and the operating subtleties, which are sometimes ignored. The correct approach to CMOS design, wherein such interrelationships are taken into account, can do a great deal to optimize a system design.

AN-592 AC Noise Immunity of MECL 10,000 Integrated Circuits

This application note discusses AC noise immunity as it relates to MECL systems. Test circuits for measuring AC noise immunity are shown, and results to be expected for typical MECL 10,000 circuits are presented.

AN-593 Broadband Linear Power Amplifiers Using Push-Pull Transistors

Two solid-state linear power amplifiers are discussed. One provides 160 Watts while operating from a 28 Volt supply and the other provides 80 Watts from a 12.5 Volt supply. Both utilize push-pull output configuration for low harmonic distortion and transmission-line type transformers for broadband coupling.

AN-594 A Frequency Synthesizer for Aircraft Automatic Direction Finding Systems

This report describes a phase locked loop frequency synthesizer suitable as the local oscillator in an ADF system. The synthesizer is designed for receivers using a 455 kHz IF system. Motorola application note AN-564 describes a similar system for receivers using a 10.7 MHz IF.

AN-595 25-Watt and 10-Watt VHF Marine Band Transmitters

Design, performance and construction information are provided in this report for two power amplifiers suitable for VHF marine band (156-162 MHz) applications. Rated power output levels are 25 watts and 10 watts. Methods of meeting the FCC low power output (one watt or less) requirement are discussed in detail. Both amplifiers can be tuned to cover 144-175 MHz and performance data is provided for this frequency range.

AN-596 A Class D Citizen's Band Transmitter Using Low-Cost Plastic Transistors

This note describes the design and construction of an economical class D Citizens Band transmitter. The transmitter features a novel high-level collector modulation method using two diodes. A double-pi output matching network is employed for good harmonic suppression.

AN-597 Power Control Using the Zero Voltage Switch

This application note discusses the advantages of zero-voltage switching using the Motorola MFC8070. A temperature control circuit is shown which demonstrates the design flexibility of CMOS and optical-coupler combinations.

AN-598 Four Terminal, Optically Isolated Zero Crossing AC Relay

This application describes a solid state relay for ac control. The output is isolated from the input by means of photon coupling. To minimize EMI, relay actuation is permitted only during the zero voltage crossing of the ac line.

AN-700 Simulate MECL System Interconnections With A Computer Program

Circuit interconnections are an important part of system design when using high speed logic circuits. The design of interconnecting paths affects both system speed and system accuracy. This application note describes the use of a computer program to simulate interconnections for high speed digital systems.

AN-701 Understanding MECL 10,000 DC and AC Sheet Specifications

The dc and ac specifications for emitter-coupled logic are somewhat different than those for saturated logic. This application note describes the specifications found on a MECL 10,000 data sheet and provides information for understanding these specifications for persons unfamiliar with emitter-coupled logic.

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